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# THE ENERGY DILEMMA: A CHALLENGE FOR MARYLAND

## PROCEEDINGS

Maryland General Assembly / AISLE Conference

December 1-3, 1977



**AISLE**  
An Intersectory Union Committee





THE ENERGY DILEMMA:

A CHALLENGE

for

MARYLAND

PROCEEDINGS

Conference sponsored jointly by The  
Maryland General Assembly and AISLE,  
An Intersociety Liaison Committee.  
Supported in part by funds from the  
National Science Foundation.

Proceedings were prepared by  
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Reference.

National Science Foundation Purchase Order  
No. 12055 provided funds for the prepara-  
tion of this document.

Any opinions, findings, and conclusions or  
recommendations expressed in this publica-  
tion are those of the authors and do not  
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Science Foundation.

STENY H. HOYER  
PRESIDENT OF THE SENATE



JOHN HANSON BRISCOE  
SPEAKER OF THE HOUSE

MARYLAND GENERAL ASSEMBLY  
STATE HOUSE

ANNAPOLIS, MARYLAND 21401  
July, 1978



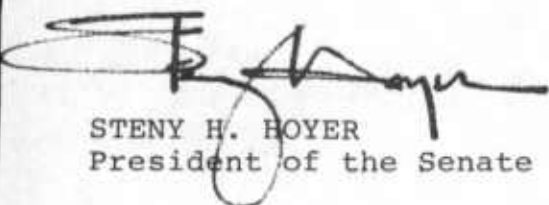
FOREWORD

These are the Proceedings of an important three-day conference on energy and the environment which was sponsored by the Maryland General Assembly and AISLE. The conference was held on December 1-3, 1977, in Annapolis, and included as participants members of the legislature, representatives of the scientific community, and interested persons from labor and business.


The objectives of the conference were to bring professionals in science and technology together informally with legislators to: a) establish channels of communication among scientists and legislators so that science and technology can be responsive to the lawmaking process; b) educate legislators and the scientific community to each other's needs; and c) exchange ideas and information about energy-related issues of concern to the 1978 legislative session. We believe the conference objectives were accomplished and that the conference also made a major contribution to the development of scientific and technical resources for the Maryland General Assembly.

You will find in these Proceedings 24 recommendations which were developed by the conference workshop. The conference was not structured or intended to produce any particular bills or resolutions although it did result in some specific legislative proposals which were considered in the 1978 session.

We hope that an increased awareness has been developed among legislators and scientists as to the interdependence of energy and the environment, and new and lasting relationships and lines of communication have been created to deal with these issues for the members of the Maryland General Assembly.



STENY H. HOYER  
President of the Senate



JOHN HANSON BRISCOE  
Speaker of the House

"To affect public policy, scientists should not talk as they do with other scientists,...but should speak plainly with the public officials on an equal footing, recognizing that the scientist is expert in his field and the public official is expert in his. To form a partnership between these two types of experts may seem like a lot of effort, but it can be done, and it works."

Dr. Seville Chapman  
Director, New York State  
Assembly Scientific Staff  
"Physics Today," 1974

## Acknowledgements

We wish to acknowledge the many people who contributed their time and effort to the planning, coordination, staffing, and conducting of the conference. \*

Senate President Steny H. Hoyer and House Speaker John Hanson Briscoe provided continuing encouragement and support on behalf of the General Assembly. Bruce Bereano, Administrative Assistant to the President, and Dr. Gerald Pannick, Administrative Assistant to the Speaker were indispensable during the day-to-day planning/coordination efforts.

The legislators on the specially appointed Legislative Liaison Committee, Senators Harry J. McGuirk and Peter A. Bozick and Delegates John S. Arnick and Catherine I. Riley, along with those on the Joint Committee on Energy, Co-Chaired by Senator Bozick and Delegate Riley, took time from their legislative duties to aid and oversee the planning process.

Members of AISLE spent lengthy hours on the Planning Committee. We are particularly grateful to Mary Schmidt Doebele for graciously passing along experience gained during her coordination of the Massachusetts AISLE conference.

Dr. Carl N. Everstine and many others from the Department of Legislative Reference furnished services such as typing, tape recording, keeping financial records, hand-printing name tags, serving at the registration desk, taking telephone messages, and performing many other necessary behind-the-scenes tasks. Lee Crippen was responsible for coordinating all of the meal, coffee break, and hotel functions.

Orin J. Durey, Assistant to the President and the Speaker, was helpful in providing equipment and logistics support for the conference. The Copy Center and Print Shop saw to needs for copying and printing both before and during the conference and produced both the Interim Report and this volume.

Rapporteurs whose voluntary services contributed to workshop success included: Marlene Stekert, Esq.; John C. Handy, Engineers Council of Maryland; Dr. Frances A. Gulick, Congressional Research Service; Alfred R. Bolz, President of the Engineers Council of Maryland; John S. Wolf, Maryland Environmental Trust; Mary Schmidt Doebele, American Institute of Planners; and Dr. Harald Schutz, Maryland Academy of Sciences.

\* In the "Conference Program" and "Conference Participants" sections of this report we have tried to explicitly name everyone who participated in the conference.

The input of observers from many of the citizen/lobbying/business/community interest groups contributed significantly to the success of the conference.

We would like to express our gratitude to the people who were invited to deliver keynote speeches, for their informative, thoughtful, and sometimes humorous remarks.

For preparation of display and distribution materials our thanks go to the American Association for the Advancement of Science, the American Association for Information Science, the National Science Foundation, and the U. S. Department of Energy.

Central to the successful operation of the workshops were the co-chairmen (named with each workshop summary) who prepared agendas, guided discussion, and produced workshop summaries, and both the legislative and professional society participants. AISLE leaders and planners, and Conference Co-Chairmen, Dr. Milton Johnson and Bernard Manheimer, provided voluntary time and expertise to all phases of the event.

The conference benefited from the many services performed by Eleanor Musk, Secretary to the Science Division of the Department of Legislative Reference. Her capable assistance was continuous from the planning stage of the conference through the publication of these Proceedings.

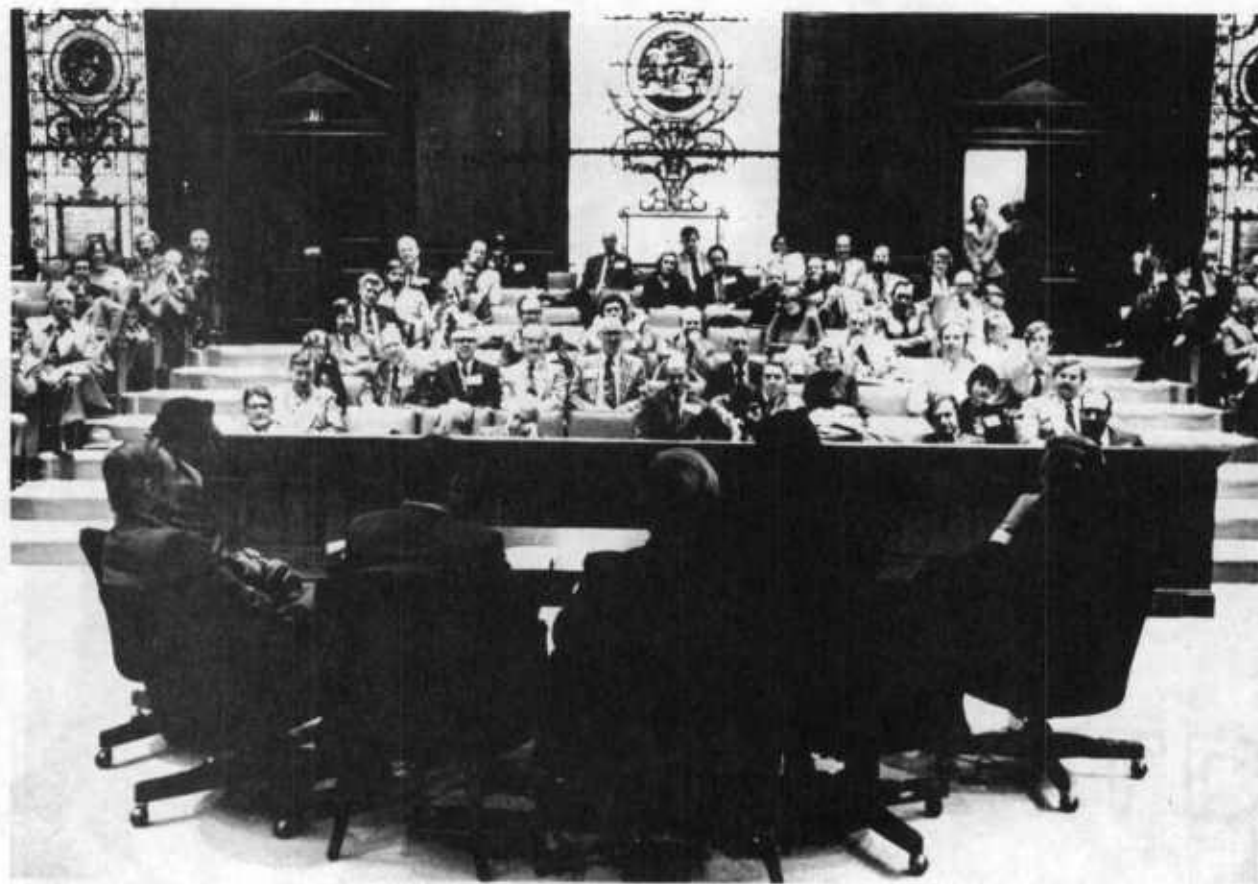
Norman Goldberg photographed the event, as displayed in this report, and Donald Schroeder of the Maryland Petroleum Association provided color slides.

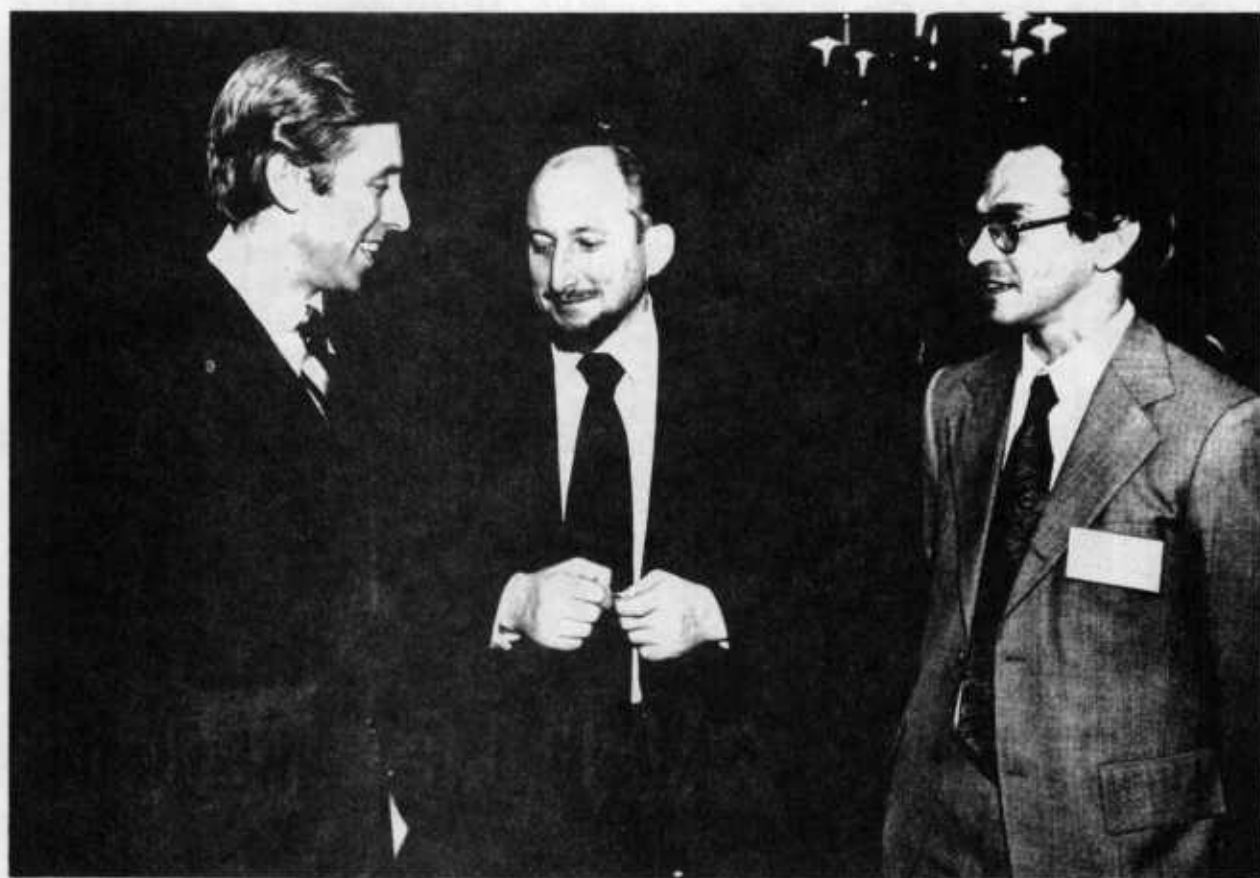
Myron H. Miller  
Science and Technology Advisor  
Maryland General Assembly

Diane Chapman Willis  
Assistant Science Advisor  
Maryland General Assembly

May, 1978







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## Summary of Workshop

### Suggestions for Legislative Action and Policy

This section summarizes the major suggestions and observations from the conference. Material is arranged according to topic.

Summary of Workshop  
Suggestions for Legislative Actions and Policy

RESOURCE MANAGEMENT

- 1) The State should have legislation for regulating the use of its geothermal resources. Federal funds are at hand for a geothermal exploration project near Ocean City - but as yet, Maryland has no statutes defining public and private rights specific to this kind of natural resource development. Geothermal power production, and aquifer protection, is codified in California and 16 other states.
- 2) Maryland ought to develop a comprehensive plan for managing the quantity and quality of its surface and ground waters. Demands for water continue to grow, approaching the runoff of our surface water drainages and the recharge rates of our aquifers. Continued compartmentalization of planning in local, regional and basin-oriented authorities tends to frustrate action on an optimal scale to meet this resource management problem. A Water Resources Development Act should deal with:
  - a) A reliable inventorying of the quantity and quality of replenishable and non-renewable water supplies;
  - b) Establishing the State's total present and projected needs for waters of various qualities;
  - c) Development of policy for allocating water supplies among competing demands, taking socioeconomic considerations as well as institutional interests into account;
  - d) Long-term planning for regional management of water quantity and quality. In assessing consumptive withdrawals, and point and distributed pollution sources, the planning process should be integrated with the Maryland State Land Use, Coastal Zone Management, Energy Conservation, and Airshed Management Plans.
- 3) The benefits and costs inherent in Maryland's management of air quality are not well quantified. The impact of ambient air quality standards and regional airshed management plans on public health and the State economy should be examined in depth. In particular:

- a) The Department of Economic and Community Development should report to the General Assembly on the economic effects of the State's having ambient air quality standards which differ from the national standards.
- b) The Department of Health and Mental Hygiene should similarly report on the public health consequences of this difference in ambient air quality standards.
- c) The Department of Natural Resources should make available to the General Assembly its assessment of the problem of disposing of wastes from stack gas desulfurization on a scale likely to be necessary to comply with the Prevention of Significant (Airshed) Degradation and New Source Performance Standards.
- d) The above-mentioned departments should coordinate their work on these reports with the task force appointed by the Governor to implement Senate Joint Resolution 45 (1977) on examining ways to more fully utilize native coals.

The value of these reports to the General Assembly would be enhanced if they could be provided by mid-February, 1978.

In addition, the Energy Policy Office should be directed to inform industries and utilities of the cost and energy efficiencies which can be realized through pollution abatement by "tight processing" via process re-evaluation and monitoring.

#### SOLAR AND NON-TRADITIONAL ENERGY SOURCES

- 4) Maryland should act decisively in promoting solar heating. Low cost loans combined with a sales tax exemption for solar installations (residential and commercial) can be a more cost-effective incentive than use of property and/or income tax credits or deductions. Subsidizing at less than 25 percent of installed unit cost provides minimal motivation, while a higher rate of public funding is deemed unaffordable by State and local government. With low cost loans, energy savings help to offset loan repayments, making the typical 10 year payback-times more acceptable to the homeowner or businessman.
- 5) Heat pumps are an effective means of conserving energy in this climate and should receive promotion by the State similar to that given to solar installations and improved weatherization.
- 6) If the pending National Energy Act does not proscribe it, the State should be aggressive in taking steps to afford itself greater flexibility in meeting the energy problem. One such area would be the siting of onshore and offshore energy importation facilities.

- 7) The legal impediments to a solar easement law should be sorted out (which goes beyond the voluntarily negotiated easements covered by HB 360 of 1976, Sklar, et al., now Chapter 934).
- 8) Direct the Energy Policy Office to work with the U. S. Department of Energy (DOE) on ways to verify suppliers' claims of solar product performance (as is now done in Florida).

#### ENERGY CONSERVATION IN BUILDINGS: INCENTIVES

##### AND REMOVAL OF DISINCENTIVES

- 9) It is recommended that the State should not attempt to promote investment in weatherization or more efficient heating/cooling/lighting by manipulating income and/or property taxes to defray private first-costs. More effective use of public funds would involve:
  - a) State aid for energy audits, engineering and planning in commercial, small industrial, and residential buildings. Assistance should be contingent upon approved plans being carried into practice. Priority for assistance should be based in part on a candidate's ability to stand these costs himself.
  - b) Well publicized demonstration projects undertaken in cooperation with the private sector. Provision should be made for protracted before-and-after comparisons of performance and for auditing of payback times.
  - c) More vigorous advertising of Federal-State grant programs to gain fuller participation, thereby better serving the State's needs and also enhancing chances for participation in competitive federal programs. The fact that such programs tend to be innovative and involve a newly reorganized agency (DOE) suggests that it might be profitable for the State to review its handling of intergovernmental relations.
- 10) Expand existing law (e.g. HB 1604 of 1975, Sklar, now Chapter 509, which stipulates that solar and other nonconventional energy systems cannot be assessed at a higher value than their conventional alternatives) to exempt from property tax assessments other improvements specifically designed to reduce energy consumption; for example, storm windows, insulation.



(This recommendation is not in contradiction of recommendation (7) which refers to tax deductions or credits.)

- 11) Require life-cycle costing in the design of governmental and non-profit owned buildings. In revamping traditional guidelines encouraging lowest first-costs, consideration should be given to capital budgeting and bond limits.
- 12) Review lending laws to ascertain that savings and loan institutions are not discouraged from making energy - improving loans on good terms (e.g. as add-ons to mortgages).

#### ENERGY CONSERVATION IN BUILDINGS: REGULATION

- 13) Adopt statewide codes with respect to energy efficiency of buildings. The ASHRAE 90-75 standards would be an appropriate basis. (Sound overall building performance, rather than prescriptive regulation of components is favored by most experts.) Options should be open to account for local climatic conditions. If some rural jurisdictions do not possess the manpower to administer the codes, a possibility is to incorporate a population density dependent exemption into the law. Priorities for phasing in implementation of the codes should be:

State buildings first;

large private buildings next;

single-family residences last.

- 14) Review, and strengthen, if warranted, home improvement law with regard to contractor licensing.

#### ENERGY CONSERVATION IN BUILDINGS: OUTREACH AND EDUCATION

- 15) The State should initiate a program to educate designers, builders, and buyers on methods of life-cycle costing. In concert with the State's universities, and professional and trade organizations, the State should compile and make readily available data for this purpose.
- 16) Institutionalize a coordinated State Energy Extension Service to effectively bring conservation assistance to communities and towns (and seek federal funding where feasible.)

- 17) The General Assembly should keep apprised of the findings of the newly-formed State Energy Conservation Board (comprised of members from the State Departments of Education, Budget and Fiscal Planning, General Services, Transportation, Planning, and Natural Resources; Baltimore City, Board of Higher Education, Agricultural Extension Service, and the Public Service Commission.)
- 18) Provide matching support to federal funding for State programs to improve energy education planning.

#### PUBLIC UTILITIES

- 19) Direct the Public Service Commission and/or the Energy Policy Office to analyze public utility records for the purposes of identifying conservation opportunities and monitoring the success of energy conservation initiatives.
- 20) Review the structure of Maryland energy taxes for regressive features. In designing relief for the needy, avoid measures which tend to encourage wasteful energy use.
- 21) The interests of conservation (efficiency) should rank alongside equity in any consideration of utility rate reform. Rate structure reforms prompted by energy conservation should begin with demonstration projects.

#### TRANSPORTATION

- 22) Improvement of transit links between the Washington-Annapolis-Baltimore areas are felt to be possible through a better coordination of rail, bus and feeder service. The legislature can be instrumental in prompting such a regional study.
- 23) Maryland, preferably in concert with other states in the region, should urge the federal government to adopt regulations which are more aggressive in promoting good automobile mileage.

#### PERVASIVE CONSIDERATION

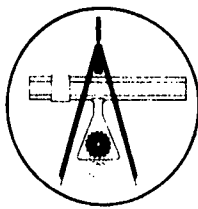
- 24) In drafting energy legislation, provisions should be included for periodic review of the effectiveness of proposed measures (as is done in New York.) The formalization of a "feedback" process will assist in the orderly refinement of State policies.





## C o n f e r e n c e   P r o g r a m

Included in this section are: an explanation of the composition and mission of AISLE, background material relevant to the Maryland conference, the schedule of events, and a list of the workshop topics.



# AISLE

An Intersociety Liaison Committee



**Please reply to:**

November, 1977

An Intersociety Liaison Committee (AISLE) was founded in early 1973, following a "Joint Conference on Technology and Governance in Achieving Environmental Quality" held at the National Bureau of Standards, Gaithersburg, Maryland. A half-dozen delegates were there from each professional society--engineers, scientists, attorneys, planners, and public administrators--to explore better methods of cooperation.

Called upon by President Steny H. Hoyer of the Maryland Senate and Speaker John Hanson Briscoe, House of Delegates, an Intersociety Liaison Committee (AISLE) will assist the Maryland General Assembly in conducting a conference on "The Energy Dilemma - A Challenge for Maryland", at Annapolis, December 1-3, 1977. The AISLE group of approximately 60 scientists and engineers will meet in workshop sessions with designated legislators and key staff members. The technologists will come together with legislators on a voluntary basis and present their own viewpoints on these concerns, having been associated with participating AISLE professional societies because of their competence, but not representing them in any formal sense.

Meetings of this nature have been held by the AISLE group with the legislatures of New York and Massachusetts; reports are available on these sessions. The AISLE representatives from more than 30 professional societies generally believe that the solution of environmental problems requires that a number of disciplines be brought into action and that practitioners of those disciplines be brought face-to-face to enhance communication among themselves. In particular, those concerned with governance on the one hand, and with science and technology on the other, benefit in terms of environmental problem solving, by exposure to each others views.

## AISLE

### An Intersociety Liaison Committee

Richard Bolt - Chairman  
Bernard Manheimer - Vice Chairman  
Bruce Conlin, Jr. - Secretary  
John Wander - Future Directions  
Margaret McNamara, ASPA  
Richard Scribner, AAAS  
Bryce MacDonald

### Maryland General Assembly/AISLE Conference:

#### Co-Chairmen:

Milton Johnson, ASPA/MTS  
Bernard Manheimer, IEEE

#### Planning Committee:

James Stekert, AAAS  
Russell Eberhart, IEEE  
Diane Chapman Willis, AGI/AAAS/MTS  
Myron Miller, Science and Technology  
Advisor, Maryland General Assembly  
Mary Schmidt Doebele, AIP  
Ajax Eastman, Maryland Conservation Council  
David Miller, Maryland Environmental Trust

#### Legislative Liaison Committee:

Senator Harry J. McGuirk  
Senator Peter A. Bozick  
Delegate John S. Arnick  
Delegate Catherine I. Riley  
Bruce C. Bereano, Esq.  
Dominic Fornaro, Maryland State  
and D.C. AFL-CIO  
William Holin, Maryland Chamber  
of Commerce

### Representatives of the Following Professional Societies Participated:

ASA - Acoustical Society of America, APCA - Air Pollution Control Association, AAAS - American Association for the Advancement of Science, ACS - American Chemical Society, AEA - American Economic Association, AGI - American Geological Institute, AIAA - American Institute of Aeronautics and Astronautics, AIA - American Institute of Architects, AIIBS - American Institute of Biological Sciences, AIChE - American Institute of Chemical Engineers, AICPA - American Institute of Certified Public Accountants, AIME - American Institute of Mining, Metallurgical and Petroleum Engineers, AIP - American Institute of Planners, AMS - American Meteorological Society, ANS - American Nuclear Society, APS - American Physical Society, APHA - American Public Health Association, ASAE - American Society of Agricultural Engineers, ASHRAE - American Society for Heating, Refrigerating and Air Conditioning Engineers, ASIS - American Society for Information Science, ASME - American Society of Mechanical Engineers, ASPA - American Society for Public Administration, AWRA - American Water Resources Association, AAG - Association of American Geographers, APCS - Association of Professional Geological Scientists, IEEE - Institute of Electrical and Electronics Engineers, ISA - International Studies Association, MTS - Marine Technology Society, NSPE - National Society of Professional Engineers, and OSA - Optical Society of America.

P R O G R A M

## "THE ENERGY DILEMMA - A CHALLENGE FOR MARYLAND"

## Maryland General Assembly/AISLE Conference

Thursday, December 1, 1977

12:30 pm      Registration (Legislative Services Building, 90 State Circle  
Annapolis, Maryland)

**2:00-4:00 pm      Orientation (Joint Hearing Room, Legislative Services Building)**

**Welcome:**

**Dr. Milton Johnson - Conference Co-Chairman**

**Legislative Branch:**

**Bruce C. Bereano, Esq. - Administrative Assistant to  
the President of the Senate**

**Executive Branch:**

**Mr. Lee Zeni - Administrator, Energy and Coastal  
Zone Administration**

### Interest Groups:

**Mrs. Ajax Eastman - President, Maryland Conservation Council**

**AISLE - Purpose and Role In this Conference:**

**Mr. Bernard Manheimer - Conference Co-Chairman**

4:00-5:00 pm Introduction to Workshop Participants (House of Delegates)

6:30 pm Reception (Annapolis Hilton Inn, Ballroom) Informal Mixer, Cash Bar

**7:30 pm                      Dinner (Hilton, Ballroom)**

**Speaker** - Congresswoman Barbara A. Mikulski

9:30 pm Workshop Chairmen meet with Conference Planning Committee  
(Hilton, Room 512)



Friday, December 2, 1977

9:00-10:00 am      Opening Plenary Session (Joint Hearing Room, Legislative Services Building)

Keynote Speakers:    Senate President Steny H. Hoyer and  
House Speaker John Hanson Briscoe

Dr. Myron H. Miller, Science and Technology Advisor  
to the Maryland General Assembly

Dr. Richard Bolt, Visiting Scientist to the Massachusetts  
Legislature, and Chairman of AISLE

10:00-10:15 am      Coffee Break (House of Delegates, Second Floor Lounge)

10:15-12:45 pm      Workshops (House of Delegates)

1:00-2:30 pm        Lunch (Hilton, John Carroll/Samuel Chase Room)

Speaker:    Representative Gordon O. Voss, Minnesota  
State House of Representatives

"Science and Technology Information in State Legislatures"

2:30-5:00 pm        Workshops (House of Delegates)

6:30 pm              Reception (Hilton, Ballroom) Cash Bar

7:30 pm              Dinner (Hilton, Ballroom)

Speaker:    Mr. Llewellyn King, Editor, Energy Daily

9:30 pm              Workshop Chairmen meet with Conference Planning Committee  
(Hilton, John Carroll Room)

Saturday, December 3, 1977

9:00-11:00 am        Workshops and Written Summarization (House of Delegates)

12:00 noon           Lunch on your own

1:30-3:00 pm        Closing Plenary Session (Joint Hearing Room, Legislative Services)

Keynote Speaker:    Dr. James L. Liverman, Acting Assistant  
Secretary for Environment, U.S. Dept. of  
Energy

Summaries of Workshops by Chairmen

Closing Remarks:    Senate President Steny H. Hoyer and  
House Speaker John Hanson Briscoe

3:00 pm              PRESS CONFERENCE (Joint Hearing Room, Legislative Services Building)

## WORKSHOPS

### 1. ENERGY RESOURCES MANAGEMENT (Room 150)

Topics such as: availability, conservation, solar (present), nuclear, coal conversion (LNG - Liquefied Natural Gas), transportation, energy rights, rate structure.

### 2. NATIONAL ENERGY ACT - APPLICATION TO MARYLAND (Room 211)

Topics such as: short-term implications; long-term implications

### 3. ENERGY CONSERVATION IN BUILDINGS AND HOMES (Room 302)

Topics such as: ASHRAE standard 90-75, incentives and controls, design standards, insulation, appliances, life-cycle cost, taxation, consumer protection

### 4. WATER RESOURCES MANAGEMENT - ENERGY IMPLICATIONS (Room 202)

Topics such as: water quality - shipping vessels, fisheries and power plants, outer continental shelf(OCS), on-shore development, dredging and spoils disposal, point and non-point sources of pollution, ground water availability and plant siting; coal-gasification, acid drainage and treatment.

### 5. ENERGY AND AIR QUALITY MANAGEMENT (Room 311)

Topics such as: implications of non-deterioration, non-compliance with regulations and medical implications.

### 6. ALTERNATE ENERGY RESOURCES (Room 218)

Topics such as: use of alcohol and other derivatives for fuel generation, uses of energy in agriculture, including methane, solar (long-range), possibilities for development of windmill generators, geothermal sources, etc.

NOTE: The topics listed under each of the workshops are not intended to be all inclusive. Participants in each of the workshops are encouraged to raise questions and other topics of interest during the workshop sessions. Each of the workshops should be conducted with consideration given to economic implications.





W e l c o m i n g   R e m a r k s

Steny H. Hoyer  
President of the Senate

John Hanson Briscoe  
Speaker of the House

The President of the Senate and the Speaker of the House were instrumental in creating the conference and followed its development closely.

## THE ENERGY DILEMMA - A CHALLENGE FOR MARYLAND

STENY H. HOYER

President of the Senate

December 2, 1977 - Opening Plenary Session

Mr. Manheimer, ladies and gentlemen, Mr. Speaker. On behalf of the Senate of Maryland, I want to welcome all of you to this conference, "The Energy Dilemma: A Challenge for Maryland," which is not only a challenge for Maryland, but a challenge for the nation and indeed a challenge for the world.

We have been extremely concerned about the energy question here in Maryland. We have as many ideas and conflicting proposals in our legislature as does Congress.

Those who participated in the AISLE conferences in the other two states which have held such conferences - New York and Massachusetts - came to Speaker Briscoe and myself some 15 months ago, and suggested that we in Maryland sponsor a similar conference. It somewhat overstates it to say that the Speaker and I are the sponsors. It is really the AISLE organization that has worked so diligently and so hard to bring together and convene the expertise that we have present here in Annapolis today. Again on behalf of the Maryland Senate, I want to thank all of you, who are experts in your particular fields, for agreeing to participate in this conference. I want also to congratulate the legislators who have demonstrated their concern about energy and the environment by attending this conference and partaking of your expertise.

Speaker Briscoe and I have observed, for some years now, that one of the problems that legislative bodies have, is interfacing with the scientific community, having the scientific community know the kind of information that we need, and particularizing that information as it relates to specific issues which confront the legislature.

One of the problems that I, as a legislator would like to communicate to you, is that in recent times, we are receiving a plethora of information with respect to many, many different kinds of issues. The difficulty a legislator now has is that of being able to separate information which is usable at any given time, applying that to a particular problem, and coming up with legislation and policies that make sense and will work.

In addition, one of the problems that I think the scientific community has, in dealing with those of us in public office, is to know what will work, what can pass, and what legislation is feasible. In that regard, I think that working with the members of the legislatures in the other

states and in our state at this conference will help you to know -- those of you who are in the scientific community -- what kind of information we really need or can use.

I think a number of things have happened in recent years in Maryland, of which perhaps you are aware. As I said, the Speaker and I have looked at particular scientific problems, especially energy as it relates to the environment, and to the business and labor sectors. Observing that the Maryland Legislature had no real focus on that particular question, we took a number of steps, one of which was to establish a fund out of which we could hire experts in particular fields. The first field to which we responded was the energy field and we recruited, both nationally and within our State, individuals who we believed had some expertise that we wanted to add to the staff.

I think most of you have met Dr. Myron Miller of our Department of Legislative Reference who is assigned a particular focus, energy and the environment, with which this conference deals.

So the Maryland Legislature has given this issue one of the highest priorities of any issue confronting our State. I think that demonstrates the concern that is felt by the Maryland Legislature and the leadership of the Maryland General Assembly, with respect to this problem.

Dr. Miller is also working with Senator Bozick, who is the chairman of our Joint Committee on Energy.

In addition, I think most of you have met Ms. Diane Chapman Willis who has just recently been hired, and whose father was active in this area with the New York State Legislature. As a matter of fact, I will tell you that she was one of the two finalists for the top job, so to speak. We got so involved in the energy issue during the first three to four months of our focus, that we felt we needed to broaden that staff immediately, because the job was sufficient in magnitude to demand not only Dr. Miller's services, but Ms. Willis' services as well.

So, we are very pleased to inform you that in Maryland, in the last seven months, we have moved vigorously to give ourselves some in-house staff which is designed to assist the Maryland Legislature in digesting that information which you in the scientific and professional community can provide.

One of the frustrations, I think, that all of us have, in dealing with the energy issue, and with so many issues that are concerned with both fiscal and natural resources, is that we are in an era of very serious trade-offs in our society where there are really no easy decisions to make; where all decisions are difficult to make; and where we, who are political policymakers, must balance the equities in our society.

Certainly, we have seen the Congress of the United States and the President of the United States having great difficulty arriving at a consensus on an energy program that makes sense for this country.

We in Maryland, of course, will have no less difficulty in arriving at such a consensus. We believe, however, that this AISLE conference will be perhaps not a first step, but certainly a second and third step towards developing the legislative knowledge that will allow us to arrive at a consensus in our State, on a reasoned and rational response to a problem that confronts us all.

I want to welcome you again to this conference and thank you for your participation. I want you to know that our staff, through Dr. Miller, Ms. Willis, Dr. Everstine, and Mr. Ratchford will be available to assist you in any way they can.

Welcome to Annapolis.



## THE ENERGY DILEMMA - A CHALLENGE FOR MARYLAND

JOHN HANSON BRISCOE

Speaker of the House

December 2, 1977 - Opening Plenary Session

Ladies and gentlemen, welcome to Annapolis. The theme of this conference is certainly a timely one because energy and environmental problems have recently become very important in public policy making. Since the purpose of this meeting is to investigate the relationship between energy production and consumption and the environment on the one hand, and public policy making on the other, I would like to take some time here this morning to articulate some thoughts from my own particular expertise.

So that we may understand the nature of the problems that confront us, we must first get together to devise some sort of common language. It has been my experience that when a politician and a scientist are confronted with a problem that threatens someone's life-style, they see very different aspects of the problem and consequently pose very different solutions. It is my hope that this meeting will help to start scientists and politicians on their way to seeing certain kinds of problems from the same angle of vision.

To briefly give you the parameters of what I've alluded to let me take a concrete example that will illustrate the problem of interfacing technology with public policy making.

The example I have in mind is the Patuxent River Water Basin which lies entirely within the State. The problem here is environmental but it raises the same questions as energy related problems. There are few undisputed facts concerning the state of the river but a number of observations can be made. The first is that the aquatic yields of the river are less than enough to sustain a rather small number of watermen. A second observation is that the water appears to be polluted and probably is, given certain kinds of scientific definitions.

The political problem is easily stated: people want the river cleaned up - they will vote for politicians who will get it done. But it's not something that can be done by passing a bill. So we turn to the technicians and scientists in the Health Department, the Department of Natural Resources and the various interested local agencies and we tell them to clean up the river.

The technicians and scientists tell us that that's not so easy to do. First of all, they tell us, there's no scientific definition of what a clean river is. We politicians look at each other and say "Clean water

is clean water, isn't it?" But the science people say "Well, if by clean water you mean a certain level of bacteria, then of course we can do that, but the chemicals we add might make the water too clean."

"What do you mean?" the politicians ask.

"Well," the science people answer, "it's possible to have water so clean that nothing will live in it."

The politicians again look at each other; obviously this dialogue is a little muddy.

"How can water be so clean that nothing will live in it?"

Answer: There needs to be bacterial action in the water to create food for the micro-organisms that are the first links in the food chain.

Well, politicians don't really understand that kind of talk so they go back to what they know: "Look," they say to the scientists, "we've got a problem here - people want the river cleaned up so that the fish and shell-life comes back so that they can again make a living off the river."

"Well," the science people say, "we really sympathize, but first we have to know what makes aquatic life stay away, if the river is at fault, if man is at fault, if some natural life cycle happens to be at some natural low ebb - in other words we need more data."

Now a politician understands the need to collect more data. We do it all the time by appointing committees, study groups, having conferences, etc. But data collection in politics tends to stem from different motivations and it has different consequences. The primary motivation is delay so that the policy options have time to become clear. In science, data collection is motivated by ignorance so that the end result is knowledge.

As far as the Patuxent River goes, it has been studied exhaustively for over 25 years. Scientifically we have bundles of knowledge, but has this knowledge helped us to clean up the river? Answer: no it hasn't. Why?

Because it would stop being science and would become social science, in other words, science would become politics. Both Scientists and politicians shrink from the BRAVE NEW WORLD where human beings lead lives directed by scientific logic. But in the case of the Patuxent River where non-point run-off seems to be the major cause of pollution, one is inexorably led to advocating population control as a direct consequence of a scientific investigation.

I need not go further this morning, the purpose of this meeting is to investigate these frontiers. But I will leave you with this thought: politics or policy-making long ago left the separate realm of the politician. Social systems overlap eco-systems and the one depends upon the other.

## Workshop Summaries

Each of the six workshop sessions is summarized in this section, which includes a list of suggested topics for discussion that was prepared in advance. The workshops varied in scope, and several overlapped on specific topics. By the conclusion of the final discussion sessions, each workshop summarized its findings and recommendations, which were then presented at the closing plenary session of the entire conference.



WORKSHOP # 1

ENERGY RESOURCES MANAGEMENT

Co-Chairmen

Senator Peter A. Bozick

Mr. Richard Orth

A. Report on the Workshop Session

To clearly focus on the problems of energy resources management the panel chose to define "Energy Resources Management" as:

the effective development and utilization of the best balance of available energy and material resources for the benefit of the public and with minimum impact on the environment.

The overall expectations of the workshop participants were met, and included the giving and receiving of technical answers to social and economic problems on a small group or one-to-one basis. Moreover, there was a warm and genuine feeling generated that channels for future communication had been opened.

B. Topics Reviewed by the Workshop

1) Affordability and reliability of future fuel supplies are often questioned. What are oil and gas prices likely to be by 1985? Are chronic or seasonal natural gas shortages foreseen for the State by 1985?

2) Does the State have policy guidelines for determining which conservation programs should be mandatory (or regulatory) and which should be voluntary?

3) Governmental incentives for energy conservation include grants, low-interest loans, sales tax exemptions, income tax credits, and property tax credits or deductions. All such measures involve expenditure of public funds to promote the social goal of energy conservation. Are there workable quantitative criteria (say, long term economic activity versus public expenditure) for granting such incentives, or is it an inherently philosophical (qualitative) issue?

4) Are there believable projections on when (or if) coal liquefaction and/or gasification will be commercially available (and competitive)?

- 5) Various states, and federal agencies are trying different methods of promoting energy conservation: tax breaks, loans, demonstration programs, R&D programs, education and performance standards. Does experience to date indicate which of these tend to be more effective, or more cost effective?
- 6) Are federal efforts to improve car mileage sufficiently aggressive? If not, how formidable are barriers to a state's attempting to achieve better mileage?
- 7) What is the feasibility of Baltimore-Annapolis-Washington rapid transit links?
- 8) Why have car pooling and van pooling programs not proven to be more effective?
- 9) Should standards of performance, or regulations governing off-hour use, be enacted for highway lighting and outdoor advertising?
- 10) What are the advantages and disadvantages of marginal and/or off-peak pricing of electricity?
- 11) What is the energy saving potential of heat pumps in this area?
- 12) What have been the encouraging and disappointing aspects of solar demonstration projects on a commercial or institutional scale?
- 13) Given the greater efficiency of diesel over gasoline power (both in engine efficiency, yield per barrel of crude, and refining energy requirements), why is the federal government not pressing diesel power harder?
- 14) Is there an approved method of removing radioactive waste from Maryland's nuclear power plant (Calvert Cliffs)?
- 15) What changes in the State's energy demand profile are expected as the average age of our population increases?
- 16) What are the percentages of electrically heated units in new and projected housing starts? Does this trend enhance the State's ability to use coal and nuclear fuels?
- 17) What steps, if any, can the State take to obtain greater participation in federally funded R&D programs on:
  - a) Coal gasification;
  - b) Thermonuclear fusion?

18) Will the Cove Point Liquefied Natural Gas (LNG) facility alleviate, or minimize, seasonal shortages of natural gas as in the winter of 1976-77?

19) What is the potential for increased in-state synthesis from naphtha (as per the BG&E plant)?

20) Additional topics for discussion include:

- a) Streamlining energy facilities siting powers.
- b) Nuclear waste disposal.
- c) Buildings: solar and conservation measures - such as:
  - i) Tax exemptions.
  - ii) Tax credits - income/sales.
  - iii) Property valuation.
  - iv) Purchase and resale.
  - v) Loans.
  - vi) Low-income grants.
  - vii) Affirmative insulation (poor and rural).
- d) Establishment of energy R&D programs.
- e) Solar easements.
- f) Public transportation system.

C. Recommendations for Legislative Action

1) Heat pumps should be encouraged because they are energy saving, particularly when combined with necessary insulation in new homes. They are good at saving energy, particularly compared with electrical resistance heating.

2) The State should support a minimum State building code (especially weatherization programs); local areas may include more stringent regulations depending on needs. Life-cycle costing should be considered; legislation should be enacted specifying that product labeling will specify the energy consumption.

3) Some solar energy and conservation measures for buildings could be:

- a) Provision of some form of sales tax relief,
- b) Property valuation exemption (there is existing legislation),
- c) Encouragement of low interest loans and grants.

4) In reviewing federal efforts to improve car mileage, the workshop felt that:

- a) A more aggressive federal approach is needed (despite economic and political barriers).
- b) The marketplace (buyer preference) can be influenced.
- c) Auto efficiency goals may differ between states, but Maryland must act in conformity with neighboring states to a certain degree. If we carefully analyze Maryland's needs, the results could put us in a position to act more assertively. Imposition of additional State regulations on automobile performance standards is possible (as in California). However, specific legislative response to this complex issue should result only after appropriate technical studies have been made and constituent consensus has been reached.

5) The panel generally agreed on the need for a uniform building code. ASHRAE Standard 90-75 was felt to be a reasonable base upon which the State could work. The Building Officials and Code Administrators International (BOCA) Code is easily achieved statewide.

6) Improvements in rapid transit links and transportation in general in the Baltimore-Annapolis-Washington area can be made through coordination of rail, bus, and feeder transportation. A thorough study of this at the State and regional level is in order. Specific recommendations are:

- a) No one model will fit - a systems approach is necessary.
- b) The State should take the lead in establishing van pools for employees - especially in Annapolis and Baltimore.



- c) The public must be re-educated to walking and using mass transportation; an environmentally and economically sound measure.
  - d) With cooperation between the public and private sector mass transportation need not be too expensive. The idea of bus service between shopping malls is a good one and has received little cooperation from mall operators.
  - e) We must make better use of what we have. The cost and availability of energy will have an ever-increasing impact.
- 7) In discussing the question of radioactive waste disposal it was brought out that the bulk of the nuclear waste problem is a result of the weapons program. The yearly volume of high level radioactive waste from a power plant such as Calvert Cliffs is estimated to be about 125 cubic feet. It is considered that this amount from power plants can be disposed of readily and safely.
- 8) An excellent film for educating the public about the energy situation is available from the U. S. Department of Commerce. The title is "Energy: Critical Choice Ahead" and it can be obtained from the Domestic and International Business Administration, Washington, D. C. 20230. Extensive showing of the film at public and civic events should be encouraged by the State agencies.



WORKSHOP #2

THE NATIONAL ENERGY ACT -- APPLICATIONS TO MARYLAND

Co-Chairmen

Delegate John W. Douglass

Delegate Steven V. Sklar

Dr. J. Thomas Ratchford

A. Report on the Workshop Session

The objective of this workshop was to analyze the National Energy Act and identify implications of the Act to the State of Maryland.

Unfortunately no National Energy Act exists due to substantial delays in the legislative process by Congress. Substantial uncertainties in national policy as it may or may not be reflected in the Act were a major challenge to workshop participants.

The Act is a complicated collection of 113 interrelated measures. This grab-bag of incentive and penalty provisions affects our entire economy. State-related provisions of early drafts included:

- 1) Enforcement of the 55 mph speed limit.
- 2) State gasoline and fuel taxes.
- 3) Severance taxes (coal, and offshore oil and gas).
- 4) Expansion of State energy office functions.
- 5) Streamlining energy facilities siting powers.
- 6) Clean Air Standards.
- 7) Nuclear waste disposal.
- 8) Buildings: solar and conservation measures such as:
  - a) Tax exemptions.
  - b) Tax credits -- income/sales.
  - c) Property valuation.
  - d) Purchase and resale.
  - e) Loans.
  - f) Low-income grants.
  - g) Affirmative insulation (poor and rural)
  - h) Landlord/tenant.
- 9) Business -- commercial and industrial conservation.

- 10) Public buildings -- retrofits.
- 11) New buildings -- energy conservation standards.
- 12) Information and accreditation hotline.
- 13) Cogeneration -- removal of statutory and regulatory obstacles, incentives, sale of surplus power/backup power.
- 14) District heating -- relation to siting and rate-setting.
- 15) Utility rate reform -- to encourage conservation and fair pricing.
- 16) Prohibitions on master-metering.
- 17) Experimentation with rate structures.
- 18) Reorganization of the Public Service Commission.
- 19) Emergency (shortages) powers.
- 20) Fuel adjustment powers.
- 21) Utility user priorities.
- 22) Solar easements.
- 23) Car and van pooling.
- 24) Deepwater port siting.
- 25) Intermittent ignition devices.
- 26) Regulation of nuclear waste transport.
- 27) Strip mining regulation.
- 28) Public transportation system.
- 29) Establishment of energy R&D programs.
- 30) Recording of cooperative agreements.
- 31) Appliance efficiency standards.
- 32) Reorganization of State energy committees.

#### Approach:

As an informal mode of procedure the workshop adopted the following approach:

- Review the status of the National Energy Act.
- Identify the issues of particular concern to the Maryland legislators.
- Make recommendations if this appears useful or appropriate.

#### B. National Energy Act (NEA)

Deborah Merrick, Staff Counsel to the U. S. Senate Energy Committee, who has been working with the conferees since the mid-October House-Senate meetings began on the non-tax measures of the omnibus NEA, briefed the group on the current status.

She pointed out that no final agreement had been reached among the conferees and that even the measures tentatively agreed upon depended on resolution of the still acutely disputed natural gas pricing, crude oil equalization tax, and taxes on business use of oil and natural gas.

Tentative agreement had been reached, however, on a wide range of non-tax conservation measures of which the following are of particular interest to states:

- Conservation services to be offered by utilities.
- Utility rate and regulatory reform measures.
- Coal conversion regulatory and tax penalty programs.
- Assistance to schools, hospitals, public buildings and health care facilities.
- Mandatory appliance standards.

Five major areas of the NEA were discussed:

1. UTILITY CONSERVATION PLAN: Utilities are required to offer the residential customers conservation services including information on insulation and other conservation measures, a list of contractors, and institutions able to provide financing. Utilities are also required to offer inspections and energy audits on the premises. If State law or the Public Service Commission approves, the utilities could also offer both direct installation and financing. The State shall submit a State plan for the operation of the program and then be eligible for federal grants.

2. RETROFIT OF SCHOOLS, HOSPITALS, AND PUBLIC BUILDINGS: Conservation measures such as insulation are available through federal grants. The State Energy Policy Office in conjunction with the State agency for each appropriate institution must approve a State plan to be submitted to the federal Department of Energy.

3. APPLIANCE STANDARDS: States are effectively prohibited from requiring their own design or performance standards after federal standards become effective. Maryland laws, such as the one on natural gas intermittent ignition devices, will probably be superseded.

4. COAL CONVERSION: Coal conversion requires large new utility and industrial boilers to refrain from use of oil or gas as the major fuel. Existing installations may be required to convert, although there are temporary or permanent exemptions possible due to practical barriers to conversion or coal supply. A strong barrier to conversion is the provision that environmental laws are not overridden, but still take precedence. A minor provision bans the use of outdoor gas lamps.

The opportunity arises for the Legislature to make a major re-examination of air quality standards because of regional shifts in fuel uses and restraining impacts on economic development and expansion.

5. UTILITY RATE AND REGULATORY REFORM MEASURES: State regulators are required to consider 11 concepts in future proceedings. Five of these, which must be considered within three years, are time-of-day rates, seasonal rates, cost of service pricing, interruptible rates, load management techniques. Also, declining block rates which are not cost-justified are prohibited. Others of the 11 concepts are tied to energy conservation, efficient use of facilities, and equity. They include prohibition of "master metering," review of automatic fuel adjustments, prohibition of discrimination against cogeneration users of solar, wind, or geothermal power, prohibition of promotional advertising in the rate-base costs, and protection against abrupt termination of service.

Each regulatory authority (the Public Service Commission in the case of Maryland) is required to "consider", by means of hearings and other designated procedures, 11 possible changes in utility rates and regulatory practices.

Whatever changes are considered or adopted are subject to the constraint that they be "consistent with applicable State laws". Hence, presumably state legislatures have the controlling role and could not be preempted by federal standards.

#### C. Conclusions and Recommendations

Given the publicity accorded to the comprehensiveness and inclusiveness of the content of the emerging NEA and Congress's prolonged difficulties in devising it, the workshop participants were somewhat surprised to discover that the Act -- even in its original form presented by the Administration -- provided relatively few affirmative requirements or specific prohibitions on State energy actions, both legislative and regulatory.

The workshop concluded that the National Energy Act is only one component of national energy policy. The Act will reflect to some extent the National Energy Plan as proposed by President Carter in April. That plan is now judged to be incomplete and inadequate to meet the Plan's own stated goals.

Unlike the perception of the energy crisis after the 1973 oil boycott, now there is wide agreement that a global shortage of oil and natural gas will exist in the near future. Whether this occurs in 1985 or 2010 affects the timing of national policy actions, but not fundamental policy directions. National policy must reflect these global supply realities.

The workshop's responsibilities to the conference did not deal with these global concerns except as they set the context for policy considerations. The narrow goal of the workshop was to clarify the National Energy Act (not yet enacted, and only one part of the national energy policy) with respect to the needs and concerns of the State of Maryland.

The workshop recognized that Maryland is strongly affected by its neighbors, and is limited to what it can achieve as an individual state. Therefore, it is recommended that the possibilities for Middle Atlantic regional action be explored and that Maryland begin working to bring about an effective regional response to the continuing energy problem.

The workshop further recognized that the state-related legislative issues raised in the above-described areas of the emerging National Energy Act were of sufficient complexity and uncertainty to require a series of definitional studies, aimed at determining the implications of the federal law, the constructive alternatives for Maryland legislative action, and the best means for bringing them about. It was suggested that at present neither the legislative nor executive branches are adequately postured to pursue and implement such studies. Consequently it was felt that under the expected pressures of the National Energy Act preliminary work is needed to provide the necessary means. It was recognized that the newly appointed science advisor to the Maryland General Assembly could make a substantial contribution by analyzing the NEA from the perspective of each standing committee of the General Assembly.

The Maryland Legislature should be encouraged in promoting new or alternative measures not in the National Energy Act for achieving energy conservation in areas where challenges unique to the State present such opportunities. Examples can be found in such activities as offshore and onshore energy importation facilities, the utilization of geothermal energy resources, the use of coal, and the lightening of the burden on both producers and consumers without reducing the effectiveness of conservation measures.

The NEA will not provide Maryland with an impressive set of guidelines nor adequate direction in choosing its own energy options and policies. In this absence, Maryland and her sister states must decide whether to rely on subsequent federal legislation that Congress may enact on the foundation of the NEA, or to move promptly and independently on its own to supplement an admittedly inadequate federal energy program.

The decision of Maryland to pass energy programs, irrespective of the actions of its neighboring states, must be influenced by both political and economic considerations, and the concomitant risks of "being first." Some feel that regardless of the chances for successfully passing such vanguard

legislation, the mere introduction and discussion of necessary bills gives legislators a vehicle to educate their colleagues and the public as to the gravity of the problem and the requirements of its solutions. Others believe that a state cannot realistically afford to do what is right if other jurisdictions do not follow, but should limit state energy initiatives to those areas 1) which involve public funds or programs, 2) where opportunities or characteristics are unique to the state or one of its regions, and 3) where the data are incontrovertible or compelling.







### WORKSHOP # 3

#### ENERGY CONSERVATION IN BUILDINGS AND HOMES

##### Co-Chairmen

Delegate Judith C. Toth

Delegate Benjamin L. Cardin

Dr. Edward H. Blum

#### A. Report on the Workshop Session

This session was devoted to identifying various problem areas that exist for energy conservation in buildings and homes. We discussed the problem of consumers not being assured of quality control and product safety. It was indicated that there are insufficient standards at this time and that those standards that are available at the federal level have generally not been disseminated down to the local level. Many of the current consumer laws and licensing laws lack adequate enforcement.

The issue of consumer education arose several times during the meeting. The question was raised as to who is responsible for getting the information to the public. A suggestion was made that periodic energy checks be made on houses and other structures by establishing an inspection system. Again it was not made clear whether this should be done privately or publicly.

Reference was made to California law which requires the utilities to monitor the flow of electricity at the lowest distribution level and report their findings to the state.

There was considerable discussion of the need for state building codes and the eventual adoption of energy standards such as those put forth in ASHRAE. There was discussion of the impediments to establishing a statewide code in Maryland. The workshop also discussed such things as energy efficiency standards, life-cycle costing, cost justification and cost effectiveness.

Problems were finally broken down into four generic categories:

- 1) energy efficiency
- 2) quality control
- 3) costs
- 4) market place

Questions were raised in each of the categories as to who should do what, how they should do it and when should they do it. This discussion led us to the point of seeking solutions in the various problem areas emphasizing that the "who" may be the legislature, the "how" may be through legislative programs, and "when" may be now or in the not so distant future.

The need for sound technical assistance to legislators was mentioned by several people, some with governmental experience and others with scientific backgrounds.

A point of consensus was that the effectiveness of energy conservation depends on the majority of all Marylanders becoming convinced that the energy problem is real and that their individual actions bear importantly on its course.

The role of energy consumption in homes can be appreciated from the following (national) data on consumption by sector: 19.2 percent by the residential sector, 14.4 percent by commercial, 41.2 percent by industrial, and 25.2 percent by transportation. Residential energy use is further broken down as follows: 72.4 percent for the combined space heating and domestic hot water, 5.5 percent for cooking, 6.0 percent for refrigeration, 3.7 percent for air conditioning, 3 percent for television, 1.7 percent for clothes drying, 1.9 percent for food freezing, and 5.8 percent for other residential uses. These percentages translate into nearly 200 million gallons of oil (or its equivalent) being used every day for the nation's space and water heating.

The workshop discussed how significant fuel savings can be realized by installing solar heating systems. Solar energy products marketed today are far from having uniform reliability or efficiency. The better solar heating systems are showing that solar can provide up to 75 percent of a home's annual average heating requirement. If five percent of all U.S. residents were to install solar heating with each system delivering one-half of each home's heating needs, there would be a nationwide savings of an equivalent 4.79 million gallons per day of fuel oil. With five percent of all households buying solar systems, market volume would encourage a decline in the prices of solar system components. If money could be made available at three percent interest, and if the engineering expertise could be assured at or below cost by public agencies, solar heating loans would self-amortize, i.e., both principal and interest would be paid out of annual energy savings.

Large energy savings could be effected by an aggressively supported residential energy conservation program. This would go beyond distributing brochures on "Tips for Energy Savings"; rather, it would combine:

- 1) Inspection of major home appliances, lighting, furnaces, and air conditioning equipment to determine operational efficiency and to estimate potential life-cycle dollar savings via replacements when sub-standard units are found.
- 2) An assessment of the adequacy of insulation, weather stripping, caulking, etc., leading to cost analysis of potential savings of corrections.
- 3) Licensing and training of contractors and certification of solar components (as in the energy efficiency regulations for major appliances now pending before Congress).

According to polls, a minority of householders is convinced that we have serious energy problems, and even fewer are aware of the dollar savings to be realized through such simple conservation measures as reducing thermostat settings by 2°F.

#### B. Topics Reviewed by the Workshop

1) What is the most suitable way of ensuring consumer protection on solar systems and insulation:

- a) Licensing of contractors.
- b) Specifications for components.
- c) Specifications for system performance.
- d) Free (voluntary or mandatory) inspection.
- e) Before-and-after energy audits.

2) An impediment to adoption of uniform energy conserving building codes is a lack of staff in some rural counties for administering such codes. Would viable options be:

- a) To have State staff (such as Department of Economic and Community Development) available on an as-needed basis?
- b) To have a central pool of contractual consultants?
- c) To exempt counties with the lowest populations from provisions of the code? (Would this bar the State from federal planning funds?)

Montgomery and Prince George's Counties have already adopted ASHRAE standards. Are they finding any unforeseen complications?

3) What has been the experience of states already requiring life-cycle costing in new public structures?

4) When will federal appliance standards (beyond air conditioners, hot water heaters) be finished? Are they good standards for Maryland? If not adequate, does the State have facilities to test appliances for itself?

5) Tax incentives, or federal grants, have been tried by a number of states as inducements to improve home weatherization or to prompt installation of solar heating devices. Common experience has been that:

a) Subsidies (of any form) amounting to less than 25 percent of homeowner costs are largely ineffectual.

b) Governmental aid in excess of 25 percent tends to be deemed prohibitively expensive.

6) Given the State's intention to promote energy savings in the home, what are the most cost effective routes?

a) Income tax credits

i) Piggybacked on possible federal tax credits.

ii) In lieu of federal tax credits.

b) Exemptions from real property assessments.

c) Exemption from sales tax.

d) Advertising campaign and/or funding (100 percent) of demonstration projects.

e) Tax holidays for manufacturers of insulation and solar devices.

f) Educational programs for realtors/contractors/lenders.

g) Standardization of components sold in State -- to promote mass marketing and reduce consumer costs.

7) How serious is the shortage of insulation; how long will it continue?

8) What are the ASHRAE 90-75 (or 77) standards? What, for example do they specify for a single family split level home (in Prince George's County, in Allegany County, in Dorchester County)? How intensive an inspection effort do they entail (say, in man-hours per typical dwelling)?

9) Many components of home weatherization (insulation, storm

doors, storm windows) have substantial (6-10 years) payback times. Home turnover rates in Maryland are seven years or less, on the average. How well do invested dollars return at resale? Would legislation requiring adequate thermal performance be helpful?

10) Are energy losses from such practices as heating enclosed shopping malls serious enough to merit regulation?

11) Should the training necessary for licensing of real estate sales agents include energy costs and conservation as part of the curriculum?

12) Are home improvement contractors adequately certified?

13) Is there enough experience with solar heating to provide actual data (rather than design specifications) on performance? If so, how well are the cost, efficiency, and reliability of these systems conforming to design expectations? Is solar energy being oversold?

14) Are Maryland's laws conducive to lending agencies providing energy improvement loans as additions to existing mortgages?

15) Are major reductions in the costs of solar heating systems expected within the next five years?

16) Would requiring disclosure of energy use costs at resale be an incentive for upgrading homes, or does the variability of residents' habits and practices make this an unreliable index of building performance?

#### C. Recommendations for Legislative Action

##### 1) Incentives

- a) State aid should be made available for energy audits, engineering, and planning of commercial, small industry, and residential buildings with payment contingent upon plans being put into practice. Priority should go to those who cannot readily afford such activities themselves.
- b) Prototype demonstrations should be supported and made in close cooperation with the private sector.
- c) Utility rate structure reform to encourage conservation should begin with demonstration programs. It would be desirable to clarify the role of the Public Service Commission and review its authority (possibly assigning some functions to the Energy Policy Office jointly).

- d) Review the restructuring of Maryland energy taxes. Currently these taxes are very regressive. Subsidies that do not encourage energy waste should be designed for the poor.
- e) Improve Federal-State intergovernmental relations with respect to administration of federal grants and loans.
- f) The workshop specifically does not recommend large state tax incentives to push energy investments by "brute force" (i.e. "give-aways").

## 2) Removal of disincentives

- a) Expand existing law to exempt from property tax assessments improvements that reduce energy consumption.
- b) Require life-cycle costing in design and selection of government and non-profit owned buildings. This will have to supersede present laws encouraging lowest first-cost of these buildings. Take into account capital budgeting and bond limits.
- c) Make sure laws do not discourage savings and loan institutions from making energy-improvement loans on good terms (e.g., as add-ons to mortgages).

## 3) Regulation

- a) Encourage incorporation of ASHRAE standards into local building codes.
- b) Set priorities for phased implementation of codes:  
State buildings first.  
Large buildings and large energy users next.  
Residences last.
- c) Stimulate use of utility records to identify and pursue opportunities for energy conservation (develop governmental capability to follow-up).
- d) Pursue legal implications of solar energy externalities such as execution of solar easements law. Examine other potential obstacles to solar use.
- e) Encourage the Energy Policy Office to pursue the possibility of verifying suppliers' claims of product performance (as is now done in Florida). Develop a mechanism for "performance guarantees".
- f) Review and strengthen Home Improvement Law (contractor licensing).

## 4) Outreach/Education

- a) Encourage use of life-cycle costing by all builders and consumers, designers, and owners.



- b) Develop a coordinated State Energy Extension Service, drawing on community, college, etc., resources and federal funds (vital to get to neighborhoods and towns).
- c) Match federal funds to improve energy education planning. As planning indicates, the State Budget should be increased for education and outreach activities.
- d) Develop a formal mechanism at the State level, with the legislature, to bring together the private sector, universities, volunteers, etc., to establish coordinated plans, set priorities, and carry out effective programs.



## WORKSHOP # 4

### WATER RESOURCES MANAGEMENT - ENERGY IMPLICATIONS

Co-Chairmen

Delegate John S. Arnick

Delegate Catherine I. Riley

Dr. Rita Colwell

#### A. Report on the Workshop Session

The energy use and needs of the State of Maryland are dependent on the size and distribution of the human population and industry. Ultimately the size and distribution of both the human population and industry are dependent on the carrying capacity of the environment. Water resources are a major component of this capacity. Water is needed for domestic and agricultural use, industrial processing, disposal of wastes, maintenance of fisheries and shellfish, transportation, and recreation. Usable water is limited in a number of ways: the amount that is immediately available, the rate of replenishment if any, and the quality of the water with respect to specific use, whether it be public health, environmental protection, agriculture, or industry.

The problem of highest priority for the State of Maryland that involves water resources are those whereby water quantity and quality is impacted by energy extraction, transport, conversion, and distribution. These include: 1) outer continental shelf extraction of oil, 2) extraction of coal and its conversion for energy use, 3) transport and conversion of nuclear energy, 4) nuclear waste disposal, 5) transport of liquefied gas, and 6) the as yet unassessable impacts of energy resources to be developed, i.e., geothermal, solar, and wave energy, energy saved by conservation, etc.

#### B. Topics Reviewed by the Workshop

Among the issues discussed by the workshop were:

- 1) What are the best estimates of Maryland's offshore oil and natural gas reserves? If gas reserves are substantial, will they substantially help to reduce winter shortfalls in the State? How soon could reserves be exploited, if there? How long would the reserve last at anticipated rates of demand?

2) In the event that offshore reserves do prove to be exploitable, what types of onshore facilities would be desirable for the State to attract? Do coastal zone siting requirements pose prudent or overly restrictive conditions for major facility siting?

3) Dredging has been practiced in the Bay since colonial times, yet licensing delays are not uncommon for even routine channel maintenance. Are there dredging and spoils disposal guidelines that are stringent enough to protect the environment but streamlined enough to avoid undue delay in processing permits?

4) What role has the delay in channel deepening played in the decline in (tonnage) ranking of the Port of Baltimore?

5) Drawdown of water tables is a concern in Southern Maryland. Will proper management of groundwater reserves necessarily inhibit the siting of major energy facilities (power plants, refineries)?

6) Do the prospects for surface water availability have clear-cut implications for major energy facility siting on non-tidal Maryland waters such as the upper Potomac? Are there avoidable institutional barriers to sound management?

7) Greater utilization of native coals raises the potential for acid mine drainage and seepage from ash and scrubber refuse disposal sites. Do current practices and inspection provide adequate environmental safeguards?

8) How serious a public health risk is posed by radioactive effluents from one nuclear plant (Calvert Cliffs)?

9) To what extent, if any, do the State's water quality standards deter the location or expansion of industry within Maryland?

10) Oyster, shad, and crab populations have been declining for a number of years. Lack of reproductive success signals that stocks will decline even further. Is the cause of this decline:

- a) Excessive fishing pressure (within and outside of the State)?
- b) Deteriorating water quality?
- c) Effects of electric power generation?
- d) Climatic changes?

#### C. Recommendation for Legislative Action

The energy problems of the State of Maryland could impact severely

on the water resources of the State, on both the quality and quantity of these resources. From the deliberations of the workshop, it became clear that although some actions are being taken, a comprehensive plan for water resources management for the State of Maryland is needed. Such a plan should be developed and implemented as rapidly as possible, working out with adjoining jurisdictions feasible arrangements for satisfying mutual interests. A Water Resources Policy Development Act should deal with: 1) inventorying the water resources, both quantity and quality (short-term, long-term, replenishable, and non-renewable water resources), 2) establishing total needs, present and future (quantity and quality), 3) determining factors controlling quality, such as land use and point and non-point sources of pollution, 4) establishing long-term measures for water quality control, and 5) assessing socioeconomic significance.

In summary, there is a need for water management within the State on a comprehensive, statewide, basis. The water management plan should be integrated with the Maryland State Land Use Plan, the Coastal Zone Management Plan, and the Energy Conservation Plan. In the development of the plan, the State should utilize its own internal resources in the State universities and executive departments, and private interests to help provide the professional analyses and evaluations needed to support sound legislative policy development.

A major topic of discussion was the strongly perceived need for scientific and technological information. Factual information concerning the effects of energy-related activities on aquatic bio-resources of Maryland are inadequate. Specific discussions concentrated on determining the effects of long-term exposure to low levels of toxic substances and biological agents. Interactions among these agents, and among these agents and physical environmental parameters are of significant concern. Research work on these topics appears to be needed and should be considered by the State Legislators.



## WORKSHOP # 5

### ENERGY AND AIR QUALITY MANAGEMENT

Co-Chairmen

Senator Edward J. Mason

Mr. Jack Anderson

#### A. Report on the Workshop Session

After surveying a number of issues (listed below) involved in achieving a balance in energy and air quality management, this workshop chose to focus on one major concern: differences between State and federal air quality standards, and possible consequences of these differences on health, energy, and the economy.

The workshop identified differences in ambient air quality standards for particulates and sulfur dioxide, and it identified differences in emission limitations relating to sulfur in fuel, oxides of nitrogen, and particulate and visible emissions. For each of these, Maryland's standards are in some manner more restrictive than the federal standards.

What are the effects of these differences? There is very limited data on health effects of long term exposure to low concentrations of these pollutants at the levels suggested by these standards. Much more is known about health effects of short term exposures to high pollution concentrations than is understood about the consequences of day-to-day exposure to ambient pollution levels. Blue ribbon panels and seasoned investigators offer different views on what are the proper trade-offs between margins of safety built into standards and economic impact. Pending more definitive data, therefore, a consensus of decision-makers is the only available basis for setting standards in the public interest.

The scientific community needs mechanisms to be able to come to a consensus on what are acceptable risks in the face of these uncertainties.

Average citizens are unable to understand air quality issues in simple terms. Their perceptions of the air quality problem are often based on both fear and lack of knowledge.

There seems to be a lack of hard data on the economic consequences of differences between national and Maryland ambient air quality standards. The workshop felt that this information should and could be made available even though the difficulty in isolating the beneficial and negative effects of differences in standards is well recognized. For ex-

ample, how do differences in standards affect the ability of the State to attract new industry, the closing of marginal industries, or the expansion of existing firms with competing plants in other states?

Some State emission limitations are uniform statewide while others vary according to the severity of local problems. The Clean Air Act Amendments of 1977 require revised "non-attainment area" plans which will also require limitations adjusted to the local severity of the problem.

It was brought to the attention of the workshop that industrial processes can sometimes be made more energy-efficient and cost-efficient if emissions are reduced through "tight processing" involving continual process evaluation by well informed management.

Indoor air pollution was discussed, and it was pointed out that insulation and tight buildings to conserve energy may result in increased levels of pollutant concentrations indoors.

The workshop recognized that there are many other problems concerning air quality and energy management, such as transportation, that need to be addressed.

#### B. Topics Reviewed by the Workshop

- 1) The Environmental Protection Agency (EPA) has deemed stack gas scrubbers "best practicable control technology" for new (major) stationary pollution sources. What is the operational status and reliability of stack gas scrubbers for utility-sized boilers?
- 2) What are the costs of converting institution-sized (e.g. prisons) oil fired boilers to coal? What are the waiting times to obtain coal and ash handling gear of this size? How would operating costs, including pollution abatement, compare for burning of oil versus Maryland coal?
- 3) Commercial use of coal as an energy source could be through direct burning, through pulverization and then burning, through liquefaction or gasification and then burning. Compare the operational status, economic feasibility, and air pollution implications of each of these alternatives.
- 4) What is the smallest sized institutional, industrial, or commercial operation which can use direct burning of coal under current technology and legislation?
- 5) Are coal cleaning (for sulfur) operations commercially available



and economically competitive, so as to permit Maryland coal to be burned in institution-sized boilers?

6) Is the state of air pollution measurement and modeling mature enough to provide the State with a basis for airshed management of sulfur oxides under the policy of non-significant airshed degradation?

7) What are the public health risks of using native asbestos-bearing gravels in road construction?

8) What are the differences between federal ambient air quality standards and Maryland's ambient air quality standards? Are there differences in other federal and State air pollution control standards? What are the public health and/or economic cost implications of any differences? Which standards will govern the implementation of the Clean Air Act Amendments of 1977?

9) Concepts of "prevention of significant deterioration" and "non-attainment area plans" were enacted in the Clean Air Act Amendments of 1972. What are these concepts, and how are they to affect economic growth in the State of Maryland?

10) In what ways are energy conservation and air pollution control mutually supportive? In what ways are they in conflict?

11) What are the most energy efficient patterns for future development in the State of Maryland?

#### C. Findings and Recommendations

1) Public education, within the present education curricula, should stress a better understanding of air quality and the practical aspects of air quality as it affects society.

2) The Department of Economic and Community Development should provide to the General Assembly all current data available to determine the economic effects of the differences between federal and State standards for ambient air quality (for particulates and sulfur dioxide) and emission limitations (for sulfur from fuels, oxides of nitrogen, particulates, and visible emissions).

3) The Energy Policy Office should provide adequate information concerning "tight processing" to the industries and utilities which might benefit from it.

4) The Department of Natural Resources should provide information on air quality standards to the General Assembly.

5) The legislature should continue to develop and refine the multi-disciplinary approach shown at this conference where legislators and the scientific community come together to exchange information useful in solving these problems.





## WORKSHOP #6

### ALTERNATE ENERGY RESOURCES

#### Co-Chairmen

Delegate David L. Scull

Dr. J. Kevin Sullivan

#### A. Report on the Workshop Session

Maryland, which imports 94 percent of its energy, is among the most vulnerable states with respect to sudden reductions in outside energy supplies. Maryland can, and in the view of this workshop should, reduce this vulnerability by strongly encouraging the development of alternate energy resources presently available within the State, with particular emphasis on renewable resources.

#### B. Topics Reviewed by the Workshop

- 1) What is the potential for developing geothermal power from granitic intrusions such as those found in Virginia's coastal plain and which are suspected to occur in Maryland?
- 2) What on-going or planned industrial activities in Maryland afford possibilities for cogeneration? Examples:
  - a) Sequential use of heat from high-grade to low-grade heating needs.
  - b) Intermittent or continuous sharing of steam.
  - c) Sale into the utility grid of electricity generated by spare capacity of industries.
- 3) What does experience to date of pilot projects (in-state and elsewhere) indicate will be the developable potential of refuse derived fuels (RDF)?
- 4) Are there locations in Maryland where wind power would presently be practical, or might be practical within a decade providing that development programs now underway have outcomes which are the most optimistic envisioned?
- 5) Should the State promote or underwrite neighborhood recycling centers, where potential fuel stocks (paper, used oil) as well as recyclable materials such as glass bottles, can be conveniently deposited and collected?

6) Does agriculture in Maryland offer attractive possibilities for utilizing "biomass" (e.g. methane, alcohol) derived fuel?

7) Can solar powered central electric generating stations provide a significant fraction of the State's power needs in the foreseeable future?

### C. Findings and Recommendations

1) Solar - Solar hot water heating is technically feasible for residential and industrial use in Maryland today. It is presently economically competitive with electrically heated water and may in the future become competitive with gas. Although Maryland's climate limits the possibility that solar power will ever be economically feasible for the generation of central station electricity, Maryland is one of the 11 states selected by the Department of Housing and Urban Development (HUD) to participate in its solar "hot water initiative" and will soon have hundreds of individual home solar hot water systems in place. State policy has been progressive on this issue. In 1976, the General Assembly authorized property tax credits to encourage development of such systems, but to date, no county has yet implemented this program. In order to remove a possible financial deterrent to installation of solar equipment, the General Assembly, in 1975, provided that the property tax assessment for a solar-equipped building could not be any higher than the assessment would be if the building had a conventional system. This has not yet stimulated significant solar installation. The State should strengthen its commitment to its existing system of tax incentives for solar development, including State financial support, tailored to complement the emerging program of federal incentives.

2) Geothermal Sources - Ocean City, Maryland has been selected as the first east coast site for geothermal development, to tap deep hot water aquifers. Seventeen states have passed legislation regulating geothermal development to protect the purity of their aquifers. Maryland has not enacted such legislation and should immediately consider the need for new legislation in this important area.

3) Wind Generated Power - It appears that wind generated power may be technically feasible in some parts of Maryland. There are presently 300-400 wind units operating in Maryland. Pioneering research in this area is currently being conducted at NASA Langley, and it is expected that this research will lead to technical improvements in these units applicable to Maryland. Joint technology transfer projects should be considered by the State of Maryland and NASA.

4) Resource Recovery - Municipal solid waste is potentially a source of one to two percent of the total energy needs of Maryland. Maryland is one of 11 states financing resource recovery and is a leader in this technology. Two State-supported plants will, by 1979, be processing 20 percent of Maryland's municipal solid waste. The development of markets for refuse derived fuels should be encouraged by State action. The State should invest in testing combustion and local uses of Maryland-produced refuse derived fuels.

5) Information Needs - There is a continuing need for a focal point for information on alternate energy sources applicable to Maryland. Maryland should continue to support an energy policy and information office. This office should identify existing State efforts and encourage coordination of programs for the use of renewable energy resources in Maryland. It should also propose appropriate legislation.





## S p e e c h e s

Speeches delivered during the conference are arranged in chronological order, starting with the orientation in which AISLE Conference Co-Chairman, Dr. Milton Johnson, welcomed everyone; Senator Harry J. McGuirk, Chairman of the Senate Economic Affairs Committee, reviewed the evolution of bills in the General Assembly (unfortunately, no transcript was obtained of the Senator's remarks); Lee Zeni, Director of the Energy and Coastal Zone Administration, presented a talk from the Executive Branch viewpoint; Ajax Eastman, President of the Maryland Conservation Council, spoke about the role of interest groups in the legislative process; and Bernard Manheimer, AISLE Conference Co-Chairman talked about the history and purpose of AISLE.

Congresswoman Barbara A. Mikulski was the keynote speaker at the opening dinner, and Opening Plenary Session speakers included the President of the Senate, Steny H. Hoyer; the Speaker of the House, John Hanson Briscoe; Myron H. Miller, Science and Technology Advisor to the Maryland General Assembly; and Dr. Richard Bolt, AISLE Chairman.

Minnesota Representative Gordon O. Voss gave the keynote luncheon speech, and Bruce Conlin, AISLE Secretary, discussed AISLE. At the second dinner, Llewellyn King, Publisher of The Energy Daily was the keynote speaker, and Dr. James L. Liverman of the U. S. Department of Energy was invited speaker for the Closing Plenary Session.

## Welcoming Remarks

Dr. Milton G. Johnson

Conference Co-Chairman

December 1, 1977 - Orientation

With the greatest of pleasure, I welcome you all to this conference on the energy problems challenging this State, co-sponsored by the Maryland General Assembly and AISLE, An Intersociety Liaison Committee. Although AISLE has co-sponsored sessions of this kind with the legislatures of two other states, New York and Massachusetts, we are thrilled by the opportunity of being of service to Maryland. For it was at Gaithersburg in Montgomery County that a meeting of professional society representatives gathered in late 1972 to ponder problems of the environment, and then several months later, formed the organization known as AISLE.

The actual planning efforts began, of course, many months ago through joint efforts of both AISLE and the Maryland General Assembly. Let me first introduce the AISLE President, who has come down from Cambridge, Massachusetts, Dr. Richard Bolt. Next is our Vice-President and Co-Chairman of the conference, Mr. Bernard Manheimer of Silver Spring. Other members of the AISLE Planning Committee include: Mr. Bruce Conlin, our Secretary from the American Society of Mechanical Engineers; Dr. Richard Scribner, American Association for the Advancement of Science; Dr. Russell Eberhart, Institute of Electrical and Electronics Engineers; Dr. Myron Miller, Maryland Science Advisor; Ms. Diane Chapman Willis, Assistant Science Advisor (whose father, Dr. Seville Chapman, was the first Science Advisor to a state legislature -- New York); Ms. Mary Schmidt Doeble, American Institute of Planners; Ms. Ajax Eastman, Maryland Conservation Council; Mr. David Miller, Maryland Environmental Trust, represented by John Wolf; Mr. John Wander, American Society of Certified Public Accountants; and Dr. James Stekert, American Association for the Advancement of Science.

And now I am particularly pleased to present to you, the gentleman in charge of the next portion of the program, Administrative Assistant to the President of the Senate, Mr. Bruce Bereano, who has performed magnificently in coordinating the planning efforts here in Annapolis.

## Deciphering The Energy/Environment Confrontation

Lee Zeni

Director, Energy and Coastal Zone Administration

December 1, 1977 - Orientation

In the Calvert Cliffs decision, the following views were expressed by Judge Wright, "...Congress did not establish environmental protection as an exclusive goal, rather, it desired a reordering of priorities that environmental costs and benefits will assume their proper place along with other considerations..." " 'Environmental amenities' will often be in conflict with 'economic and technical considerations'." "To 'consider' the former 'along with' the latter must involve a balancing process..." "...In each individual case, the particular economic and technical benefits of planned action must be assessed and then weighed against the environmental costs; alternatives must be considered which would effect the balance of values..."

Even before the Calvert Cliffs decision, the environmental ethic had become part of our State conscience, and Maryland citizens have accepted the costs of protecting their natural resources. In order not to lose an inch of ground gained in real environmental protection, it is necessary that neither overzealous production of energy nor extreme environmental points of view prevail. Dr. Sam Schurr, Co-Director of the Center for Energy Policy Research, Resources for the Future, wrote recently, and I quote,

To devise positive approaches to the simultaneous achievement of energy supply and the environmental objectives is probably the most urgent task facing energy policy today. The needs of the future cry out for technical and institutional solutions that will permit forward movement to be made on both energy supply and environmental protection, but action continues to be thwarted by the sharp adversary aspects of the energy-environmental conflict and by sheer defeatism.

Nothing that I will say this afternoon would argue against Dr. Schurr's views.

It does appear then, that the scientists and legislators participating in this conference need to pledge themselves to a partnership for balanced action to preserve the value of the State's irreplaceable environment and to allow for adequate energy for Maryland's economic and social well-being through the application of laws and environmental constraints

that are scientifically sound. It needs to be acknowledged that scientists, despite years of diligent study, do not have all the answers to the energy/environment confrontation. In order to produce results useful to the decision making process it is necessary to challenge the scientists. These challenges must require scientists to acknowledge the responsibility of balancing the complexities of reality while at the same time retaining the highest caliber of professional veracity.

It further needs to be acknowledged that laws are not always derived from a carefully considered set of goals. Take for example the national approach to the control of thermal pollution. Congress by law declared that heat was a pollutant and set us toward an astonishing national goal -- zero discharge of any heat into the waters of the nation. Ridiculous, but it is the law; and more disturbing, federal courts have ruled that even ridiculous laws must be obeyed.

The basic question before you that needs answering now is whether Maryland wants to have available over the next several decades more energy than it now has, or whether it wants to go with what there is. If the answer is more energy, the choice is whether such additional energy will come from preventing waste of present energy use, nuclear fission, the burning of more coal, the importing of more oil, the development of outer continental shelf resources, or some combination of all of these. Then, can our energy demands be met within the constraints of environmental laws?

Over the next few minutes, I will briefly outline a few difficult situations where partnership for balanced action is needed if we are to provide for the ethical and rational use of energy while protecting the environment and without causing unreasonable social and economic costs to the citizens of Maryland. I will also give you an example of how scientists can help make decisions founded in the dictum of the Judge Wright decision. In my discussions I will not take the time to describe in detail various terms, concepts, and issues, but rather briefly describe several situations that Maryland is faced with in trying to meet the challenge of the energy dilemma.

Take the situation with the 1977 Clean Air Act Amendments which allow the federal government to redesignate certain areas from Class II to Class I. States also have unilateral authority to designate Class I areas.

The redesignation of an area from Class II to Class I has a significant impact on a state's ability to site a coal-fired power plant. For example, in flat terrain a 1,000 MW coal-fired plant with two percent sulfur coal, 99 percent efficient precipitator, and 80 percent efficient SO<sub>2</sub> scrubbers can be sited in a Class II area but must be at least 20 to 25 miles from the border of a Class I area, depending on local meteorology. This means approximately several hundred square miles from the borders of a Class I area are ruled out from power plant siting based on air emissions only.

When other siting criteria are also considered, i.e., water quality, seismic, prime agricultural lands, and so on, it would be impossible to site a coal-fired power plant in most of Maryland.

Also, the 1977 Clean Air Act Amendments require that in any area where the ambient air quality standards are not met (termed a "Non-Attainment Area"), new sources of that pollutant are not allowed unless an equivalent reduction in emissions of the pollutant from existing sources is achieved. Baltimore and Washington are non-attainment areas for photochemical oxidants. A draft Environmental Protection Agency (EPA) policy indicates that any major source of photochemical oxidants (which includes medium-sized or large fossil-fueled power plants) within 85 miles of Baltimore or Washington will require an emissions offset. The difficulty lies in finding controllable sources to offset. Approximately 80 percent of the photochemical oxidant emissions in Maryland come from mobile sources. Therefore it seems more appropriate to the energy dilemma that control strategies for photochemical oxidants should focus on the transportation sector rather than on energy production. In this case, emphasis on energy conservation in the transportation sector has a greater payoff for the environment.

The Federal Water Pollution Control Act Amendments of 1972 establish a goal of zero discharge of pollutants, including heat, by 1985. In the case of thermal discharges, this would require the use of closed cycle cooling systems, such as cooling towers. Some existing power plants are subject to this requirement as well as new plants. Estimates of the cost for backfitting cooling towers on Calvert Cliffs, for example, range up to \$400,000,000. Energy penalties of eight percent at peak load and three percent on an annual average would be incurred since cooling towers cause a derating of the plant capacity and require extra power for pumping. A provision exists to allow variances from the requirement of using closed cycle cooling, but the variance is only determined on the basis of aquatic impact, without consideration of such factors as cost or energy penalty. An energy penalty of three percent in Maryland will probably require the construction of an additional 300 MW generating capacity with its own inherent aquatic impact. At the very least, a level of aquatic impact at one site will be transferred to another site.

Premature technology is also a trade-off factor. The rush to the use of solar energy has brought a rash of disappointment because the energy source is appealing, but the systems are not fully developed. The Department of Energy receives over 2,000 telephone calls a week requesting information on solar energy, and here in Maryland 6,000 people call the Energy Policy Office asking for solar hot water grant application forms. But look at what happened in New England where the New England electric systems hot water experiment program fell down. One hundred homes in that pilot program averaged an energy saving of only 17 percent, and 15 of those

homes managed to save only five percent of hot water heating costs. Obviously, the systems were inadequate for the job and could not produce the expected 30 percent savings.

Presently the technology is at the point where it requires very careful manufacture and installation in order to work. There is little room for the human errors that the installation and use of conventional equipment can tolerate. Until solar systems operate well in spite of human errors, they need to be considered a premature technology in the solution of the energy dilemma.

Llewellyn King of Energy Daily, who is scheduled to speak to you tomorrow night, recently commented that the next big crisis to be encountered is a dearth of certain raw materials such as manganese. Further, many important raw materials needed in the energy formula are not found in the U.S. -- we import bauxite and chromium for example. These are subject to the problems of foreign supply and cost just as oil is. When legislating new devices that depend upon such raw materials, we have to consider their availability as well as the energy cost of processing them into useful form. If it takes more energy to manufacture a so-called energy saving device than that device will deliver in a useful lifetime, no net energy saving is achieved. At this point, I will give you an example of a dilemma where objective and imaginative science can help decision makers decipher the energy/environment confrontation.

One of the most significant arenas for requiring an appropriate balance between the economy and the environment are the EPA new source performance standards for the emission of pollutants by power plants. These standards require most new power plants to use closed cycle cooling systems, as opposed to open cycle or once through systems, in order to control the emission of heat. While the federal government initially contemplated closed cycle systems to reduce heat, it turns out that they very effectively reduce entrainment damage to aquatic organisms, such as fish eggs and larvae, which can be drawn through the plant's cooling system. The costs of closed cycle systems can add a significant increment to the economic cost of a power plant. Using figures developed by Power Plant Siting Program (PPSP), it is possible to translate the use of cooling towers at the proposed Douglas Point Nuclear Power Plant into an indication of environmental and economic benefit as a trade-off to the economic cost.

On the economic cost side of the balance, we consider figures for the costs of various cooling systems. For a "typical" nuclear plant consisting of two 1200 MW units (Douglas Point will use two 1178 MW units), the incremental capital cost of natural draft cooling towers, i.e., the cost over a once through cooling system, would be about \$17 million total for the two units. The cooling towers would utilize 10.8 MW of power more than the once through system for pumping power and would cause

derating of 60 MW due to decreased efficiency. The evaluated present economic cost of the natural draft towers, including everything but replacement power for the derating, is calculated at \$82 million.

PPSP studies showed that the proposed Douglas Point Plant, with a water withdrawal by the cooling towers of 80 cubic feet per second (CFS) during the spawning season, will entrain an average of 0.6 percent of the striped bass eggs and larvae spawned in the Potomac. A comparable plant with once through cooling would require roughly 4,000 CFS and would entrain 50 times as much, or 30 percent of the striped bass eggs and larvae spawned in the Potomac. While the entrainment of 0.6 percent of a striped bass population will have no adverse effect on sustaining the adult population, an entrainment of 30 percent could cause an irreversible decline of the population. For our example, we will consider that the 30 percent entrainment will lead to a comparable reduction in the adult population which is available to the recreational and commercial fisheries. PPSP studies indicate that the Potomac contributes an average of 4,823,000 pounds to the east coast and Chesapeake Bay striped bass fisheries. Using figures estimated for the value of striped bass, i.e., five dollars per pound for recreational, and 50 cents per pound for commercial, one calculates an annual loss to the east coast and Maryland striped bass fisheries of approximately \$5,078,000 and \$2,037,000 respectively if once through cooling were used at Douglas Point. To compare these values to the economic costs of closed cycle cooling we convert to a present worth basis and find that the present worth of the loss to the total east coast striped bass fishery with once through cooling at Douglas Point would be about \$122,200,000 and the loss to the Maryland fishery would be \$49,000,000. Clearly we have an example where the environmental benefit of a control technology outweighs the economic cost of the technology when one considers the possibility of an irreversible decline of the population.

And as a final thought, returning to my earlier statement that laws are not always derived from a carefully considered set of goals, a good example is the new Federal Surface Mining Control and Reclamation Act. In regards to the Act, while it is not only desirable but imperative to establish objectives on a national basis for strip-mining -- such as controlling water pollution, maintaining land productivity, and re-establishing land stability, we question the feasibility or desirability of the federal government prescribing how these objectives are to be attained, given regional variability of climate, topography, soils, and other factors.

A specific example may illustrate what we believe to be an inappropriate approach currently being followed in the draft regulations. Under Section 2020.6 (Protection of the Hydrologic System), design storms and other design standards are specified. For example, permanent diversion structures must be constructed to carry the peak runoff from a 100-year 24-hour storm, and large settling ponds must be designed to store the

runoff from a 25-year 24-hour storm. While such criteria may be appropriate in certain regions of the country, adherence to these criteria in steep-sloped areas of Appalachia will frustrate achievement of other basic objectives set forth in the Act, such as return to approximate original contour and return to at least pre-mining productivity. Further, in many cases in western Maryland, compliance will require disturbing up to 50 percent more land than the mining operation itself. For example, Section 710.11(d) of the proposed surface mining reclamation and enforcement rules requires the application of all the standards prescribed in the proposed regulations, on lands used, disturbed, or redisturbed in connection with or to facilitate mining after May 3, 1978. In Maryland, haulroads, ponds, and diversions are generally constructed to Soil Conservation Service designed criteria. Section 710.11(d) would require that ponds and haulroads now in place in western Maryland be reconstructed to meet the requirements of Section 715.17 of the proposed rules, even if the mining operation were to be completed shortly after May 3, 1978. This requirement will result in great environmental damage because of the disturbance required to bring the construction into conformance with the proposed regulations.

We have communicated these points to the federal government and have urged it to formulate regulations which (1) set forth objectives in clear, operational terms, (2) rely upon the expertise of the regulatory authority and the professional planning and design expertise mandated by the Act to achieve the environmental performance standards in the Act, and (3) allow for regional variation in how these objectives will be achieved. We believe it is necessary if the several basic objectives of the Federal Surface Mining Control Act are to be compatibly achieved. At the present time we do not know if we have been able to make the points strongly enough to influence the regulations. I doubt it! What he doth, he doth by rule of thumb, and not by art. Or in other words, follow that old Navy verse which says: "When in danger, when in doubt, run in circles, stomp and shout."

I apologize for ending on a sour note. I felt compelled to speak to the energy dilemma in Maryland. We need an energy policy that truly addresses the environmental problem. We need your scientific and legislative knowledge translated in a common sense way into well conceived legal requirements to deal comprehensively with Maryland's environmental and energy needs.

Thank you for the opportunity to bring these thoughts before you at the beginning of your deliberations. I look forward to the workshop reports on Saturday.



The Role of the Special Interest Groups  
In The Legislative Process

Ajax Eastman  
President, Maryland Conservation Council

December 1, 1977 - Orientation

While the word "lobbying" may have bad connotations to some people (visions of special expense accounts), to most of us, lobbying is a challenge, an art, and especially a necessity. It is incumbent upon us to present our special interest point of view. Naturally along with the challenge comes the responsibility of disseminating relevant information, clearly, briefly, politely and most importantly, properly researched and documented. The credibility of a group will hinge on the reliability of the information presented.

Many groups use special tools for lobbying. For instance, the Maryland Conservation Council, which I represent, publishes during the General Assembly session the Conservation Report, a weekly newsletter on legislative matters relating to the environment. This newsletter is beneficial to those who are interested in following the legislative progress and supporting or opposing specific environmental bills. Conservation Report is designed to produce action. Other organizations actively engaged in lobbying also have their own special legislative reporting system, be it an internal newsletter or one for public distribution.

The issue which brings us together today and for the next several days is an especially challenging issue for special interest groups such as the Maryland Conservation Council. We have long been interested in the energy issue and in fact were instrumental in persuading the Maryland General Assembly to sponsor a forum on energy during the 1977 session. Our intention was to show that there is indeed a body of public concerned with the problem of diminishing energy supplies and escalating energy demands. Involved in that forum along with the House of Delegates and the Senate were the League of Women Voters, the Maryland Environmental Trust, the Baltimore Environmental Center, and the Environmental Law Committee of the Maryland State Bar Association.

While the record of the energy bills signed into law by the Governor last year was rather dismal, I believe that two very important actions did occur. First, a science advisor was appointed to assist the General Assembly and secondly, a special joint committee on energy was created to review energy legislation during the interim. These are positive steps in the right direction, but we do need to go much further in Maryland.

Meanwhile, the great debate continues in Congress; figures are released showing our energy consumption soaring to new highs; more figures

are released showing our importation of foreign fuels slipping over the half-way mark; our national financial picture is becoming bleaker as a result; and national leadership is vacillating under industrial pressure.

Here in Maryland we have a special responsibility to act on the energy issues before us. There is much that the states can do outside of the National Energy Plan, when and if it becomes a reality. Maryland can provide incentives for conservation, such as low interest loans or tax credits. We can legislate a statewide building code for thermal and illuminating standards. We can legislate life-cycle costing for selecting state funded buildings. We can change the utility rate structure to encourage conservation. We can do a lot to help the energy predicament.

A conference such as this will hopefully help us to learn more about the possibilities for energy futures. We must work to carry out those energy policies which are cheaper, easier and more socially acceptable. Our old ways are no longer any of the above.

I commend as required reading to each and every one of you here today a book by Amory B. Lovins, entitled Soft Energy Paths, Toward a Durable Peace. For in this provocative, carefully documented book I see hope for the future, if the proper paths are chosen. Those paths suggested do not mean that we must radically alter our life-styles or do without, rather they would mean improving energy efficiency, greater reliance on renewable energy and gradual replacement of centralized, large scale technologies which are so wasteful.

The role of the special interest groups is to make sure that the proper paths are considered in the legislative process and that has already begun, continues here today, tomorrow and throughout the General Assembly to come.

I wish to express my thanks to AISLE and the Maryland General Assembly for sponsoring this important conference, and I look forward to positive action resulting.

## AISLE - Its Purpose and Role in this Conference

Bernard Manheimer

AISLE Vice-Chairman

and

Conference Co-Chairman

December 1, 1977 - Orientation

An Intersociety Liaison Committee (AISLE) was founded based on a number of beliefs, relating both to the nature of professional societies and legislative bodies.

Certain characteristics of professional and technical societies -- broad geographic dispersion; balance in membership among industry, government, and academia; almost all-inclusive subject matter coverage; and availability of a very large reservoir of voluntary man-hours each year -- make them a unique potential source of relatively non-partisan expertise for legislators at all levels of government who are laymen scientifically and technically but who must make decisions on issues with significant scientific and technical ramifications. With some current encouraging exceptions - AISLE being one - the societies have not played a significant role in providing such expertise. They should do so by devoting more of their voluntary efforts to the public interest because it is needed and because it is owed, since without public support, particularly tax advantages and financing of time and travel for professional activities, most technical and professional societies could not exist.

It would appear that the supply of willing expert witnesses to appear before legislative bodies at all governmental levels is more than adequate. However, an examination of state and local legislative processes and the method by which witnesses are scheduled is cause for considerable concern. In most states and localities, key legislative witnesses are members of executive agencies or organizations with a stake in the outcome, and are advocates rather than disinterested observers. They have access to schedules of hearings that are often very difficult to obtain, and their appearance is part of their job for which they are paid. In New York City, for example, the City Council once considered a bill that would have banned atomic reactors within the city. Witnesses appearing in opposition to the bill included executives of the local power company; high officials of the Atomic Energy Commission, including a commissioner; a prestigious dean of engineering who was, coincidentally, a consultant to the electric company; the New York Commissioner of Water Supply, Gas and Electricity; other city executive officials; and the most powerful union leaders in the city. All had reasons to favor the construction of atomic reactors within the city. Their only opponents were several scientists from a nearby national labora-

tory who chanced to become aware of the hearings the day before and took annual leave to attend. Even if balanced technical presentations were available at legislative hearings, they would often fail to have the desired impact. By the time a bill is scheduled for formal hearings, many legislators have committed themselves to a position and are unlikely to change their minds in public.

AISLE was founded to provide advice to state legislatures, and adopted procedures based on the aforementioned beliefs. Thus, the participating professional and technical societies identify members who will attend conferences on a voluntary basis. Professional attendees are designated by the societies as experts, but do not, and need not, represent any viewpoint but their own.

Workshops are designed to permit a relatively free exchange of information (chairmen are asked to prepare brief agendas, but they are not binding and are not intended to restrict time or direction of discussion). Alternate points of view are sought and, in the informal setting, are weighed against each other. Subjects of immediate interest to the participating legislators and legislative staff are, of course, discussed, including in many cases specific pending or about to be introduced legislation. In addition, conference planners seek to include subjects that will be of importance, but are not yet pressing issues for most legislators.

It should be emphasized that AISLE conferences, including the Maryland General Assembly/AISLE Conference, are not one-way affairs, nor ends in themselves.

A principal AISLE tenet is that scientists and engineers require as much guidance about governance as legislators do about science and technology. Thus, the conferences are designed not only to inform legislators, but to serve the very useful purpose of providing participating professionals with insights about the legislative process and where they may usefully intervene with their data. Also, the conferences are regarded as mechanisms for introducing legislators and legislative staff and professionals to each other. Continuing relationships among them are foreseen, and professional participants are selected using proximity criteria that assure ease of communication.

Congresswoman Barbara A. Mikulski

Keynote Speaker

December 1, 1977 - Dinner

Thank you very much, Speaker Briscoe, for that rather elaborate and detailed introduction. You have me so terrific, I can't wait to hear what I'm going to say.

I thank you very much for interrupting your dinner and letting me speak tonight. I have a very special meeting in Baltimore, and I have to be in Baltimore City, in the middle of the Third Congressional District, by 9:00 o'clock tonight, while observing the 55-mile-an-hour speed limit. That's a problem.

I'm very delighted to be here, and any time a big city politician can help just a good old country lawyer, good ol' boy like Speaker Briscoe, why I'm delighted to do it.

The last time I helped a good ol' boy, his name was Jimmy Carter and he got elected President, and I got put on the Select Committee on Energy.

I also got sent to China, and when Speaker O'Neill approached me and said, "Congresswoman Mikulski, the President and I would like to send you on a diplomatic mission to China." I said, "Gee, you guys will do anything you think will get me out of the country."

I'm very happy to be here at what I consider an absolute historic conference in Annapolis; a meeting between scientists and practicing professionals, the academic community, and legislators, I think is really an outstanding event to be taking place. I understand that this type of meeting is only the third in the nation, and I think it really reflects the needs of a contemporary legislator.

For those of you who are legislators, you know the criticism they often make of us, and for those of you who are here to advise us, to teach us, maybe you don't know what people say about us.

Well, one of the things I know is that when I was in the Baltimore City Council, everybody thought that I worked one day a week, one Monday night, and the rest of the time I spent drinking wine with Mimi Depietro at Velleggia's. Now, part of that was true. I drank wine at Velleggia's but it wasn't with Mimi.

I know that for those of you who are in the General Assembly, many people see you as 90-day wonders, that you whisk down here, rent a little room, and

pass all kinds of legislation. They think that for your 12 thousand big bucks a year the other nine months of the year you're having just a good time.

Well, those of us who are really straightforward, honest, legislators know that this is not a part-time job. You and I know that being a legislator really never ends, whether it's a call a person received from somebody who is going to be evicted because they didn't get an unemployment check, or whether it's trying to figure out who to put in prison or how to save the bay or what. It's not only a full-time job, it is a full-time preoccupation. Expectations of a contemporary legislator are horrendous. Aren't we the men and women who are told by the people to keep our noses to the grindstone, our ears to the ground, our shoulders to the wheel, our eyes on the ball, and our fingers on the pulse, to kick the bureaucrats off their guidelines and, maybe, even to have close encounters with the third kind? And we're supposed to do that on a part-time basis.

You and I know what the real demands of a legislative person are, not only in terms of constituent service and response to the needs of our districts in terms of grants and making sure that the government works at the local level, but we also have reached the point where legislators are receiving new demands. That brings us to this meeting, here, tonight.

There are new issues. You know, years ago, you could drive in from southern Maryland and talk about the tobacco crop; you could drive down Route 2 to Baltimore City and talk about where Jack Pollack had his say, or about some of the great bosses who have now met the Great Beyond. But what we really know now is that the contemporary legislative bodies in 1977, like the Maryland General Assembly or the Congress of the United States, are dealing with very special, highly technologically-oriented issues. We are trying to decide about energy policy, how to have an environmental policy, and so on.

We all know that we need to know more, as well as to do more. I think that the great thing about this meeting is that we are really talking in a partnership dialogue atmosphere. I know that we legislators need to turn outside of ourselves to experts--be they the practicing technician, or the academic--to try to get the kind of technical background we need.

Well, for those of you from the world of academics and for those of you who are the practicing engineers and biophysical scientists, I think you are going to learn about the practical politicians and what it takes to make the kind of policy we need.

I'm very happy to see this kind of dialogue going on because I think it is absolutely important.

We elected officials tend very much to be oriented to what we call the bottom line. We are very much concerned about the economic and social impact of what we do on legislative policy.

Ultimately, we have to ask the question, "What does this mean to Mrs. Murphy's gas and electric bill?" Ultimately, we have to ask, "Is the policy we are going to set on air quality going to open up jobs at Bethlehem Steel while they are under the gun of Japanese imports, and are we going to place a new gun to their head?"

Well, what do we do? How do we strike the balance between jobs and environment? How do we resolve the issue of capital accumulation and, at the same time, worry about Mrs. Murphy's gas and electric bill?

But why are we worried about that?

One of the things I know is that we must learn the technical aspects of issues in order to make public policy.

Some months ago, I was asked by Speaker O'Neill to serve on the Select Committee on Energy. It was a new committee designed by the Congress of the United States to deal with the energy policies proposed by President Carter. It was over 400 -- (END OF TAPE RECORDING).

Editorial Note: Unfortunately, our primary tape recording system did not work, and at this point in Congresswoman Mikulski's delightful speech, the back-up tape recorder also quit working. We sincerely regret the technical difficulties.

Dr. Myron H. Miller

Science and Technology Advisor to the Maryland

General Assembly

December 2, 1977 - Opening Plenary Session

President Hoyer spoke of several legislative initiatives that have been recently taken to help deal with the technical scientific decisions that are being thrust before the General Assembly, and I would like to give you a very brief status report on where some of these developments now stand.

The recently created Joint Committee on Energy, which is chaired by Senator Bozick and Delegate Riley has been active over the interim and has been deliberating on energy policy issues, such as thermal performance standards for buildings. It has also been holding preliminary hearings on topics; for example, tax incentives for solar installations in homes. Their report will be forthcoming shortly.

At the direction of the Legislative Policy Committee, there has been active for some time now, a Legislative/University Council which is chaired by Delegate Goldwater. On it are representatives of Maryland's entire academic community, as well as people from the legislature, and they are examining mechanisms for making the services of the universities (that is, both the state universities and private universities within Maryland) accessible to the legislature in a very ready and direct fashion.

For instance, if a response is needed on some technical issue, say a technical brief, it is hoped that a turnaround time of the order of two weeks can be attained from the time a legislator makes the request to the time a written white paper is put in his hands, together with a summary, should he wish one. Informal briefings or in-depth seminars are alternative types of responses a legislator could have at his option.

This new venture is being approached in the spirit of a trial and, right from the beginning, mechanisms are being thought of to assess and modify the operation as it goes along. Several other states have had some experience, good experience, with this type of linkage with the academic community, and they all tell us that every state is different, every academic community has its own style and, obviously, every legislature has its own style. However, we have some good guidelines from which to work.



Earlier this year, the leadership of the Senate and the House created the positions of Science and Technology Advisor and Assistant Science Advisor to the General Assembly. Those posts are currently being held by myself and Diane Chapman Willis. We work under Dr. Carl Everstine in the Department of Legislative Reference, and the fundamental purpose of our office is to provide service and assistance on scientific matters of interest to individual legislators, with a primary emphasis on energy and the environment. However, any question from a legislator can be addressed.

One of our goals is not to give advice, in the sense of making a legislative recommendation. Our functions are really four-fold: the first of which is to summarize, compare and, if necessary, translate or critique technical material on an issue of interest. I would say that would be an issue of interest to an individual legislator speaking in his own behalf, or for a constituent, or at the request of a committee.

A second function is to act as a broker or clearinghouse for technical information coming in from the executive agencies, federal agencies the State has to deal with, and universities. This is a brokerage whose focus is primarily on extracting information of interest to the legislature, but it has happened on some occasions that we simply perform a good office between various other branches of government that want to be put in contact with one another.

A third function is to assist with the analysis of technical issues. I say assist, because the particular specializations of a staff of two cannot possibly cover every niche of information that reaches us. We are trying to tap a larger resource pool of intellectual muscle, if you will, as well as to have flexibility, so that if in the heat of battle, 20 requests come in all at once, there will be a mechanism for handling them. The way it has been done in some other states -- and as I mentioned, the Goldwater committee is looking into that -- has been to tap into the academic community, but not only the academic community.

We have been getting quite good services from the National Conference of State Legislatures, and from AISLE, and with the addition of the academic community to our resource pool, our method of operation would be to receive a question, speak with the sponsor to ensure that the problem was posed in a tractable form, then send it out to this network of experts. We would get a quick response on when an answer would be ready, and if there were a multiplicity of answers. Generally, I think we try to get a multiplicity of answers, because many issues are inherently arguable, both on a scientific level and on other levels. It is always good to have more than one response, and one of the functions of our office would then be to summarize these responses and put them in perspective. If the issue is inherently polarized, one wants to present the pro and the con as fully as one can. So that is the analytical function of the office.

Finally, we are the staff to the Joint Committee on Energy.

I would just like to conclude my remarks with an observation. The workshops that are about to start in a few minutes are, primarily, to involve a flow of information between two groups whose backgrounds and perspectives with respect to technical information are quite different.

I think a legislator tends to see technical information as a means for converting a technical issue into the basic terms with which he must deal, namely, social and economic costs and benefits, and how these relate to Maryland's common good. In other words, once he has the level of technical expertise he needs, he has simply begun his problem and reduced it to the more fundamental level that he normally has to deal with. So he really has two problems in one, if you will.

I think the scientist at large, first of all, likes his subject material. It is interesting to him. It is what has drawn him to his profession. It is what has shaped his training. And, the technical information includes everything he is going to know about the problem he wishes to solve. Inherently, in that information, is his solution. So, I am saying that this vehicle of exchange, this technical information, is going to be viewed from two very different perspectives. I think it has been mentioned by everyone, but I think the scientists that are here from AISLE today are a subset of the scientific community in that they have this additional special interest that motivates them -- a long standing desire to see scientific information put to use, to become a help to responsive governments, instead of a hinderance to them.

Thank you.

Dr. Richard H. Bolt

AISLE Chairman

December 2, 1977 - Opening Plenary Session

I was very fortunate indeed to have been invited to that first meeting which led to the formation of AISLE. I think all of us who attended the meeting had one basic concern: how could we make scientific and technical information more effective in the solution of public problems.

We all know how to develop scientific knowledge and engineering techniques. We know how to apply them to conventional problems in our economy. But how can we make science and engineering more effective and applicable to the very complex public problems such as those we have been hearing about here this morning?

At the meeting, after much discussion about how and where we should start, we decided to focus on the state level, instead of the federal level, or several thousand municipal levels. We believed that most public problems really are solved at a local level. They are not solved in Washington, though Washington may come forth with policy or funds, restrictions or admonitions. Problems are solved locally. It seemed to us that there was, perhaps, unique potential for the 50 state governments, and especially their legislatures to serve as a kind of geometric mean between one federal government and some 50-squared municipalities. A state legislature could have the ability to understand the technical complexities implied by a new federal regulation, or by a social problem, and it could have the ability to help the individual cities, no one of which could afford to have a cadre of many scientists and engineers to help solve the problems.

And so we decided to start working with the state legislatures. We were met with a quandry; were we going to invent some new mechanism to make the application of technical knowledge more effective in public problem solving, and just put that mechanism into effect, or would we do some experiments? It was obvious we needed some experiments, and because of the diversity of the states, we needed more than one. We did not know then that we would be having three preliminary experiments (i.e. three AISLE conferences - New York in 1974, Massachusetts in 1976 and now Maryland). However, we believed that there is enough similarity among the states so that what we learned in the first and the second, might be of some interest in the third, and that collectively, we would have made progress.

Bernie Manheimer mentioned early 1970 as the time of our first meeting. It took about a year and a half to put together a conference in which we were

just talking to ourselves -- 100 persons from about 17 different professions. The first time we met with public problem solvers was the AISLE conference in Albany, in 1974, the next time was in 1976 in Massachusetts, and the third time is here in Maryland in 1977. Now, our problem is how to institutionalize what we have learned. How do we put it on the track, so to speak, and try to promulgate the basic lessons that we have learned in these three experiments?

At this time, I would like to bring you a message from Massachusetts. We had hoped very much that the major contributors to this effort in the Massachusetts legislature could have been here today. One is Senator Robert McCarthy, and the other is Representative Thomas Mahoney. They have both been very active in the development of scientific capabilities in the Massachusetts legislature, and they are the co-chairmen of what we call the Science Resource Committee. This Science Resource Committee has operating under it a science resource office, a science resource network, and some of the same kinds of activities that Myron Miller was describing to you a few minutes ago.

It turned out that this week is almost as bad a time as we could have found for those two men to leave the State legislature. Some rather urgent and exciting things are going on, and I would like to read you their letters. The first is from Bob McCarthy:

"I would like to thank you for affording me this opportunity to express some of my thoughts to those legislators and scientists attending the AISLE conference in Maryland, that I will be unable to personally attend. I hope that the attendees of that conference will come away with the same positive experience that we in the Massachusetts legislature received as a result of the June, 1976 conference.

"The conference that was conducted with members of the General Court, here in Boston, provided a valuable exchange of ideas and possible solutions between legislators and the many professionals from the scientific and engineering communities. The broad range of views that was presented pointed out the great difficulties with proposing legislative solutions to technical problems.

"As Senate Chairman of the Science Resource Committee, I was pleased to see that many worthwhile discussions occurred, both during and after the initial conference. It appears that several pieces of legislation resulted from actions of the participants at the June meetings."

"It is my belief that we must continue to support this valuable interchange of ideas between legislators and professionals. I hope that you will convey my thoughts to the attendees of the conference in Maryland. I would also like to discuss the results of that conference with you upon your return."

That is from Bob McCarthy, the Senate co-chairman of our science effort in Massachusetts.

Tom Mahoney found himself in exactly the same position and, very regretfully, was unable to be with you today to give a talk, as he had been invited to do. Here is Tom Mahoney's letter:

"Initially, I would like to thank you for affording me this opportunity to express my thoughts to those legislators and scientists attending the AISLE conference in Maryland that I will be unable to attend.

"I hope the attendees will come away with the same positive experience that we in the Massachusetts legislature received as a result of our conference in June, 1976. As you know, the face-to-face communication that took place between leading members of the Massachusetts legislative community and the technical professional community during that conference strongly reinforced the base of mutual understanding regarding the urgent public problems confronting us at the state level today and the various alternative solutions to those problems.

"The conference here in Boston was highly successful in bringing together the members of the Massachusetts legislature with a wide range of specialists from about 40 different professional societies, in science, engineering, planning, and other specialties. Effective solutions to the many problems we discussed very often require the multidisciplinary approach, as well as the interaction of science, technology, and government that is inherent within the concept and design of a conference such as your AISLE conferences.

"As House Chairman of the Joint Legislative Committee on Energy" -- (and that is an appointment that Tom Mahoney received a few months after our AISLE conference. Also, the creation of the Joint Committee on Energy in Massachusetts was a direct result of discussions that took place in the AISLE conference in June of 1976.) "As House Chairman of this new committee, I have seen that the discussions during and since that June conference have strongly impacted and favorably benefited several pieces of legislation for which my committee was directly responsible, in addition to others that reached the floor of the House and the Senate. In fact, the June conference could be said to have been an influential factor in the subsequent establishment of the Joint Committee on Energy.

"I believe that the results of the AISLE conference we held in Boston last year clearly reinforced the concept that practical solutions to the complex, interrelated problems facing state legislatures today require and strongly benefit from the coordinated skills and knowledge of many different professions. It is my hope that the conference you will attend in Maryland will prove to be as rewarding for those participating there as it was for us in the Massachusetts legislature."

Well, i am pleased to have had an opportunity to bring the greetings from these two gentlemen in our Massachusetts legislature.

If i could now back off a little bit from my formal responsibility to bring you these letters, i would like to just say a few words, sort of philosophical in nature, about particularly what we are trying to do in AISLE.

I found recently, in print, a couple of statements that come pretty close to expressing the way that i think many of us in AISLE have been trying to sort out some difficult problems. A difficult problem i have in mind is the following. As scientists, especially those of us who have practiced in basic scientific research, we pretty well know how to dig out new knowledge about nature. As engineers, we pretty well know how to use the right formulas, concepts, and approaches to design a bridge or an electronic circuit. Competent scientists, engineers, and professionals in other fields such as accounting, law, and planning have technical tools and know how to use them.

Now, when we find ourselves in the public domain, in a context in which we are trying to apply these rather specialized professional technical capabilities, something strange happens. If we go alone to a poll to vote we are really thinking about which candidate we want, or if we write a letter to our Congressman, we are thinking about a question of social equity or whatever it may be, and that is fine. But, somehow, when we get into situations in the public domain, we tend to fuzz the two things together, i.e., scientific information and personal value judgements.

One of my definitions of a democracy is: a race between education and disaster. Education means that if you really are going to have an open society, truly a democratic system, you want at least 51 percent of the people to understand the situation well enough to make good judgements. We are fortunate that in this century there has been a tremendous increase in the spread of understanding and knowledge and information. (I do not necessarily use the word wisdom in that collection of words. I think a lot of that is yet to come.) Just look at some facts about education: we started this century with fewer than 10 percent of the relative age group graduating from high school, and less than two percent from college. Now we have over 70 percent coming out of high school, and nearly one quarter of the age group graduating from college. If one believes in cultural continuity, as one must to some extent, early in the year 2000 we will have more than half of our people graduating from college. The college degree in itself may not mean so much, but in this century we have gone from an essentially agrarian society -- (in 1860 we were 80 percent on the farm) -- into a very different kind of society. In 1960 we were only eight percent

on the farm, and with industrialization, which means not only the industrial type of revolution of a couple of centuries ago, but really a scientific revolution, we need understanding of scientific facts and engineering and technical knowledge and capabilities.

The question is really how can we, as scientists, engineers, and professionals in other fields, learn to convey understanding of the needed technical information to policy makers and decision makers. We have got to learn to separate the science from personal judgements.

Let me read you a relevant quotation from a statement made by Dr. McGill, who is President of Columbia University:

"We are weakening America's scientific leadership by unwittingly establishing the principle that the conflicting advocacy of the legislature or the courtroom is the best way to develop sound, public policy in science and technology... The adversary methods for arriving at truths on which our legal procedures are based is, in simple language, not appropriate for arriving at sound public policy on scientific matters. Scientific questions simply cannot be settled by persuasive argument."

Thank you for the opportunity to be here.

Representative Gordon O. Voss

Minnesota State House of Representatives

December 2, 1977 - Luncheon

I really welcome the opportunity to be here at your conference, although for less time than I would wish to spend. I would like to stress that I mean that statement as a compliment to the Maryland Legislature's program for information-gathering and this conference. I think it would be all too easy to suggest that anyone in his right mind would rather be anywhere than Minnesota in December.

I was asked to visit with you regarding S and T (science and technology) information and its access to state legislatures, and I found that somewhat difficult to try to prepare for you. The reason I found it difficult is that Maryland has been advancing so rapidly in the area of developing its information system that it has become a situation almost akin to that of the student's skill surpassing that of the teacher. You certainly have almost all of the mechanisms already in use that we know are in existence and that have been used elsewhere.

So I think I will change a little bit from what I had intended to do, and I will just try to give you some general observations about the problems of S and T information movement into the political arena. Then, perhaps, I will tell you what the activities are of the National Conference of State Legislatures Science and Technology Committee, of which I am a chairman, and whose major project has been to try to develop capabilities in the 50 state legislatures for use of science and technology as a viable part of the legislative process.

First, are those general observations about information movement. I think that the legislators here probably will regard most of what I say as very trivial, but I think it is necessary to continue to say it so that people understand how we as legislators work and deal with information.

Legislators -- all of them that I have ever been near, including my own, -- are always information-poor. They are constantly making decisions on very sketchy information, which is a particular problem we will talk about a little later. However, it does bring to my mind a little story, which is a true story, and it emphasizes the problem.

I had a fellow legislator who lived in the next district to me back home, who came up and said to me one day in a period of particular frustration for him, "I feel like a mushroom." And I said, "Now that's a rather strange thing to feel like. Why do you feel like a mushroom? I



don't understand your statement." He said, "Well, that's very simple. I'm always kept in the dark and I'm fed nothing but horse manure."

At any rate, at that particular time I think he certainly was feeling that he did not have any information on which to base his decisions, and he had a great deal of frustration about it. But there is a particular need inside of the general need for legislatures to have technical information.

Since about the middle of the 1960's legislatures across the country have been getting more and more involved in more and more issues. They are becoming more active bodies than they were historically. In addition, the body of information that they are dealing with is also expanding, and expanding into related social technical areas. So legislatures commonly are being called on to make decisions which have a great deal of technological impact. That need to understand technical information is one I think that Maryland, certainly, has recognized, and is the reason for your being here.

Legislatures are information-poor. I would say that as just a general observation.

The second point, which may also appear trivial to you, particularly those of you who are in the legislature, is that there is a priority list for information with which people in political worlds deal, and that priority list of political information is different from that with which the people that are in the other brands of life, deal. In general, a legislator responds first to his constituency. Will a constituent accept or not accept what I am about to do as a legislator? That is the most important piece of information.

The second most important piece of information to a legislator is how will his peer group react to his proposals? So first and second in importance to a legislator are constituent information and then peer group information.

Thirdly in importance is the substantive information -- the information about whether or not something will actually work in a physical science world. This is the frustrating thing to people that are out in society, particularly people that are in the technical community who see legislative decisions that appear to them to be nonsense. Because the substantive information is third on the list, whenever the other two sets of information are invoked by some highly emotional area, the third set is going to be set rather far down in the legislator's or legislature's thinking. You will see some very interesting results, and you have seen some very interesting results of this process, I am sure, in Maryland. We certainly have in Minnesota. It is something to keep in mind when you think about how to deal with the frustration of the political process, when you want legislators to make the perfect decision.

There are natural information barriers which were not very evident here at your conference but they come up between political people and technocrats, if you will. First of all is the obvious one: both groups have their own language. But I do not think that is very important. The other one, which is extremely important, is that the methods under which they operate their businesses are considerably different. The political individual generally works with an adversary system, and the technocrat generally works with the system based on repeatable facts of the scientific method, suggesting that he is always objective. Now, the political person has never met somebody who is not biased and has a very difficult time dealing with the lack of bias. That is a barrier to information transfer between groups.

I would like to make a comment on the importance of technical information. If we subtract technical information from the general field of information for legislatures, you will find that historically the technical information has been of very minor importance, really very minor importance. If you compare it to tax and finance information, that tax and finance information simply has got to be available to the legislatures before other information. We are seeing some changes now, such as with the energy issue, which you are involved with at this conference. It has a great deal of political glamor, or at least, political awareness to it, so it is able to be dealt with.

There is another factor involved with the importance of technical information which I do not think is really well understood by most of the people in the technical community, and that is time frames. As I listened to the Energy Resources Management workshop this morning, I heard one legislator from Maryland here complain that they have four years to make a decision and you are talking about a 20-year problem. The time frames simply do not work, and that is a barrier -- a real barrier. Political people have to deliver something in a very short period of time.

The glamor issue is also one that I would like to segregate out. Once a state has developed a capability for general technical information for the legislature it is very easy to move to an area of specific technical information. That is easy. But the catch-22 is that it is not easy to develop a capability for general technical information. Often, that is not recognized, and the reason that it may seem trivial to you here is that it obviously has been recognized by Maryland, evidenced by your creation of a science advisor for the legislature. You will recognize, however, that what you are here for right now is, in fact, that glamor issue.

I would like to move from those general observations and talk a little bit about the National Conference of State Legislatures Science and Technology Committee, and what it is that we do.

We were formed back in 1973 as a kind of response to those general problems that I have just indicated; that is, that legislatures were poor in general information sources. Now, 1973 was not very long ago, and back in 1973 there were only three states, I believe, that had identifiable science and technology resource capabilities. That is, you could name an individual or an organization within the legislative branch whose responsibility was to provide or to be a link for that kind of information.

We now have 19 states, although I would hesitate to suggest that it was because of our efforts. We have tried very hard at the Science and Technology Committee level in the Conference to do this but, because of information and communication barriers as much as anything, I think we have been prohibited from moving as fast as we would like.

Our project originally started with support by the National Science Foundation. The National Science Foundation (NSF), as Bruce Conlin indicated earlier, has changed its emphasis because of an Act of Congress which created an entitlement program, which I think is going to be very important to the 50 legislatures. It is called the SSET program (not to be confused, please, with the SST program) -- the State Science Engineering and Technology program, and it is a planning program to start with entitlement of \$25,000 per legislature. The contracted entity to assist the legislatures in starting S and T offices is, in fact, the National Conference of State Legislatures (NCSL). Our Science and Technology Committee serves as the oversight body for that function of NCSL.

NSF is letting out the application in a series of three stages. The first stage, which was early this summer, had 13 states in it. Thirteen states, of which Maryland was one -- and again, I compliment you, applied for the money to plan development of their S and T programs.

The second stage was just completed. Eighteen states were in that stage, and Minnesota was one of them. The third stage is yet to come. We hope that we can get perhaps not 50 states as was indicated earlier, but maybe at least 40 states to work with. We would be very very pleased if we could get that level of participation at this time.

That is the major function of the Science and Technology Committee of the National Conference of State Legislatures.

For those states that do not wish to extensively develop an ability to handle science and technology information, we are also trying to provide some of that information for them. To that end, we have formed another acronym, MISTIC, which stands for Model Interstate Scientific and Technical Information Clearinghouse. We are providing a service to state legislators who contact the Denver office of the National Conference of State Legislatures. John Reuss is our Director for the Science and Technology Program

to transfer information. That program is sponsored by, I believe, seven of the mission agencies of the federal government. The support for the program is coming totally from the federal government and not, in fact, from the states, which I find is a compliment to the federal government in the area of trying to move information into state and local government.

Another activity that we have been engaged in, is really a series of activities. We have been sponsoring regional conferences or workshops. I can recall one we had on nuclear waste which was held in 1975 in Las Vegas, Nevada at the atomic test site. Then we had a couple in 1976. One was to evaluate the effectiveness of these S and T programs. Another one was the Energy, Water, and West program in Denver.

We have also been sponsoring programs with S and T information content at the National Conference of State Legislatures' annual convention, in order to try to build awareness of our business. For instance, at the last convention, in Detroit, we sponsored a program on the DNA controversy with respect to public regulation, and also a program on the use of taxes, either as incentives or disincentives for pollution.

Finally, we also use the series of meetings that the Science and Technology Committee goes through, as a resource identification mechanism.

Let me add one more thing and I will conclude with that. There is something potentially very important, that has happened in our state and local governments in the use of technical information, and that is that the federal government has just recently formed an intergovernmental science, engineering, and technology panel in the Office of the President. About a year ago it was actually made functional. The exciting thing about the formation of that particular panel is that it gives us a potential for direction onto the research agendas of the laboratories of the federal government, something that I think has terrific potential.

We have representatives on that panel now from almost all of the entities of local government. We have three state legislators, some mayors, governors, city council people, and county level people. The avowed purpose of that particular panel is to assess the needs of the state and local government and then to add those needs into the federal budget.

With that, I will conclude and wish you luck with respect to this conference. May I suggest that, perhaps the most important thing you will get out of this conference is not, in fact, whatever the legislation may be that directly sprouts from it, but the communication channels that you are opening here right now.

Thank you.

A. Bruce Conlin, Jr.

AISLE Secretary

and

ASME Director of State and

Local Government Relations

December 2, 1977

Good afternoon ladies and gentlemen. I would like to take this opportunity to discuss AISLE briefly. AISLE provides legislators with access to sources of technical competence. Legislators gather information largely from listening -- face to face contact with resource persons -- rather than from reading. Bernie Manheimer conceived the idea that the collective knowledge of professional societies should be applied to public problems through collaboration with legislative officials. AISLE provides the platform or setting enabling specialists identified by their professional societies to address the science, engineering, and technology (SET) aspects of public problems. Societies and associations are mobilizing their forces to respond to requests from state SET offices. These state science offices have been encouraged by the Science and Public Technology Division of the National Science Foundation (NSF), and especially by the NSF State Science Engineering and Technology (SSET) planning grant program. Approximately forty (40) states are applying for the grants, which enable a state to develop or improve an SET office. For example, the Ohio grant calls for using retired engineers and scientists to work up to the social security limit. The grant that Maryland received will be used to develop the science office, headed by Dr. Myron Miller, that it set up last spring in the Department of Legislative Reference. Before the inception of that office, Dr. Schutz, a retired electrical engineer who is here today, served as a part-time science advisor to the Maryland Legislature. The state SET offices serve as an information transfer mechanism -- they serve as the broker, translator, or interpreter between the inquiring legislator /legislative staff and the responding resource person (engineer or scientist). Legislators and their staffs need to have resources available to evaluate and interpret the complex data presented to them.

Professional societies have an opportunity to play a significant role in the transfer and utilization of SET information -- the building or strengthening of the capacity of state governments to use SET information, again, with emphasis on people as the transfer units. This is occurring in a number of states, Minnesota and Massachusetts in particular.

As Dr. Richard Bolt stated last June, we are "advocates of objective information." The AISLE approach is non-partisan. We support both sides of the aisle. It is our desire to increase the flow of useable information

from the professions to the legislative process. A major objective of this conference is to have professionals continue to serve as resources to the science advisor, the Department of Legislative Reference, and the Legislature. This was the purpose of requesting biographical information. Please make sure that Mrs. Willis, Assistant Science Advisor, has this information. Compliance is an indication of your willingness to serve as a continuing resource. There is a good chance that you will be tapped since your experience relates to current issues.

The late Dr. Seville Chapman of the New York State Assembly Scientific Staff stated the problem of communications quite succinctly:

Scientists and engineers usually are totally unaware of how to get something done in the public sector. There is a problem of communication between a technological culture and a public administration culture which have different backgrounds and value systems.

To further quote Richard Bolt, "the multiplicity of professions involved in AISLE activities stems from one of our basic observations concerning the solution of societal problems. Such problems generally do not arrange themselves neatly in accordance with professional or academic disciplines."

Twenty-seven (27) societies/associations are participating in the Maryland AISLE project.

Since its inception in 1971, AISLE has remained unstructured with no dues or by-laws. A portion of my time represents the total staff. Valuable support and counsel have been provided by Dr. Richard Scribner of the American Association for the Advancement of Science. Separate from AISLE, I have worked with 13 states during the past year in connection with my job with the American Society of Mechanical Engineers (ASME). ASME has been concentrating on developing a Public Affairs Program with emphasis on interfacing with SET offices, Research and Information Offices, and staff to certain standing committees.

Early in 1978 we will be deciding on the future of AISLE. Pennsylvania, Minnesota, Illinois, and others are all interested in hosting an AISLE project. We need to find ways to improve our effectiveness. One project per year does not meet the need. Dr. Bolt talked this morning about moving from the experimental stage to the production stage. The Science Policy Act calls for the professional societies to serve as resources. If any professionals attending this conference would like to contribute to developing policy for AISLE by serving on the governance body, please let me know.

Thank you.

Llewellyn King

Publisher of The Energy Daily

December 2, 1977 - Dinner

Good evening ladies and gentlemen, and thank you very much for that introduction.

The matter of political labels in energy has become terribly important, because one of the things that has happened in the past ten years in the nation, and certainly in the time since the Arab oil embargo of 1973, has been a tremendous polarization over energy policy and, in the course of this polarization, certain labels have been attached to attitudes that have to do with energy as a technology. Political labels have been put to things that are not in the political arena in any logical way. Therefore, we find an extraordinary situation today, in which, if you are in favor of the redistribution of wealth, of civil rights, of a more egalitarian society, of a greater sense of universal justice, and a transportation system that works -- if you are in favor of these noble human aspirations, it turns out that, in today's polarized world full of political label-hangers, you are against the oil companies, you hate nuclear power, and you believe there is an energy crisis.

In the same way, if you happen to believe that, for all of the problems of technology, for all of the things that technology has not delivered that we expected it to deliver, if you happen to believe that the corporate system is the most efficient we have, and that technology is, in fact, very good for us because it gives us a great diversity of things, and we live in a technologically supported society, if you believe all that, you are supposed to be in favor of us keeping the Panama Canal, and you are also against welfare reform.

I find the logic of this extremely hard to follow, but that is the nature of the polarization. We have an issue that we have never seen the like of in the political arena before, and we have now bought it on two levels. We have it philosophically as a political problem, as though we could vote more energy into the world, and we have it practically; as a matter of fact, we are running out of it.

If you get into this matter of energy statistics, and I am sure you have had enough of them in the past two days, there is not much point in looking at prospective statistics of what might happen in five, ten, or 15 years, because that is quite impossible to predict and nothing has ever happened the way people have projected it to happen.

For example, if you were one of the middle, upper middle, or upper class in the last century, you might have wondered whether the middle class could survive into this century, simply based on the fact that with the growing of the middle class it was quite apparent that there would not be enough domestic servants to go around. Well, the middle class is with us, and we have survived that particular shortage. Therefore, I submit to you, it is very dangerous, difficult, and unrewarding to worry about shortages that might come up.

However, you need some prudence which can be gained from the statistics of the past. The statistics of the future are enormously unreliable, just as the technologies of the future are unreliable. For example, the Department of Energy, which has got available to it a great deal of statistical information, is of the opinion that natural gas is basically a depleted resource. This is a view which is expressed quite often by Jack O'Leary who is outrageously brilliant, but on the basis of his reading of the statistics, he just happens to believe that natural gas in the ground is depleted. It is on the wrong side of the supply curve whether you put the price up or not, and you must move on to something else.

The American Gas Association, which also has computers, and also has some sort of feel for the gas in the ground, believes there is 40 to 50 years adequate supply of gas at the right price.

The Wall Street Journal, which does not have any statistics, does not have any computers, is mercifully unencumbered by anything except prophets, is of the sincere opinion that there is 1,000 years of gas in the ground.

These are not trivial organizations. These are the best minds in the field. So do not worry too much about the projected energy shortfall, because you do not know where it will occur any more than you know about your own mortality.

In retrospect, however, you will discover that at the commencement of the Arab oil embargo in 1973 we imported 29 percent of our petroleum requirements. This year we have imported 48 percent. In the meantime, we have had Project Independence, we have had all kinds of coal conversion, and we have had the speeding up of power plant licensing. The fact of the matter is, we have not done anything; we have had a decline in the domestic production of oil. We are consuming more oil and producing less of it, and this is a very serious matter.

It is not a problem in and of itself, that we are a customer of OPEC. It is probably a good thing because I suspect the presence of the Americans as a major purchaser of Middle East oil is a very stabilizing thing in that market. It sort of turns the OPEC countries into the world's utility, in a sense, and they have very little choice but to pump oil.



The problem is that their supplies are not inexhaustable and their stability is not predictable. What would happen if, say in 1984 (which is the date chosen by the CIA), the Soviet Union became a major purchaser of international oil? That would totally change this importation picture. On the other hand, at some point, possibly 1990 to 1995, depending on world production and world demand, the Middle East with the largest pool of oil we have -- somewhere around 65 to 70 percent of the proven reserves in the world -- itself will peak in production. Then oil will become a commodity in short supply internationally, with horrendous consequences for the whole of the free world. It is a tremendous threat to the stability of the free world and to our economic system.

That is the basis of our energy crisis. There is remarkably little we can do about some parts of the energy dilemma, and a great deal we can do about others.

We do not, for example, have to be short of electricity in the United States, although we probably will be in some years time. We do not have to have cold homes because we have many alternative sources. However, we also have a set of institutional barriers that are quite substantial, and that prevent us from solving those problems that it is possible for us to solve.

We get electricity, as you know, from making a fire under a rather elaborate kettle of oil or coal or gas, or even worse, we use uranium in the most complicated kettle you could possibly imagine, to boil water to turn a turbine so that we can have some electricity. But the fact of the matter is that our choices for continuing to do this are extremely limited; they come down to coal and uranium. Neither is ideal.

We have a lot of coal, but at a horrendous environmental price. It is logistically difficult to transport; it poses a particular threat to the ecology of the Rocky Mountain region; and it is a problem to mine it and a problem to burn it.

Uranium is something of a problem to mine; it is perceived to be a problem to transport; and it has the problems of proliferation and the problems of nuclear wastes which will long outlive our society.

These problems are further clouded because they are part of the political polarization that I have discussed. People closest to them are the least disturbed by them. You can look at that both ways. You can say that is because those people have a vested interest in them and therefore, they are not disturbed by them, or you can say they understand them and, therefore, are not disturbed by them.

As it happens, the western world and the communist world are going to proceed with a fairly substantial nuclear power program on the basis that for many countries, that is the only option available. Those countries include most of the eastern bloc satellite countries that now depend on the Soviet Union for all of their basic fuels. Japan and much of western

Europe like France and Italy, have very little choice but to move into a nuclear power era if they are to remain high-producing industrialized nations.

Coal, I think, is going to be a very substantial and major fuel in the United States. I am not entirely sure that it is environmentally and socially more acceptable than nuclear power. In fact, I think it is less acceptable, and that is certainly not the conventional wisdom of the time, but I think the insult to the environment posed by the massive conversion to coal is very considerable. I also think that all the hydrocarbon fuels are so fundamentally precious that we have to look at them in a different way and with a greater reverence than we ever had to before.

You are presented with an unanswerable equation that goes something like this. Is it better to leave future generations an entirely barren world in which you have burned all the oil, gas and coal you could find, (and there are no other fuels that we know how to convert, and there are no more of those marvelous hydrocarbon feed stocks that give us everything from plastics to pharmaceuticals); or are you to say we will not leave nuclear wastes to another generation? The answer is, like so many things, somewhere in the middle.

We will leave radioactive wastes because we have already generated them in the weapons program, and we will extract huge quantities of coal, probably at a very high cost to human life and the environment. We kill, in our deep mines in this country, quite callously, quite regularly, between 150 and 250 miners a year, and we do not seem to care very much about it. But if we were to kill one person in a nuclear power plant, it would make the front pages all over the world. This is part of the problem we are dealing with in trying to establish an energy policy where parts of the technology -- things that should not be in the political arena -- have moved into the political arena.

The largest reason why we might not get from here to there in energy supply, and why somewhere in the future (-- the statistics range all the way from two years from now to near the turn of the century --) we are going to feel a series of shock waves of shortage, is an institutional one, because we are not going to drill for all the oil that we might find, or for all the natural gas that may remain, nor are we going to build a nuclear power plant that we might build, nor are we going to extract coal. The reason for this is that we have come to a subconscious decision in the nation not to grow. There is what I call a negative dynamic in the country. When I came to the United States -- I had been living in London -- in 1963, I came because I was rather frustrated; I was young, enthusiastic, and rather frustrated by the constraints of English society, and I thought that, possibly in America I would find some of the frontier. At that time, I read a book

written by one of the editors of Life, in which he described British society as no society, a social order, in which there were more ways for people to prevent you from doing what you wanted to do than there were to encourage you to do it.

In the same treatise, he described the United States as a yes society where believers were basically marked yes; where people would give you a chance and where you could build things and do things and there was still an air of adventure and openness. Well, in the intervening years, we too, have become a no society. There are some very good, sound reasons why this change has taken place and I would not dismiss it out of hand.

There have been profound shocks to our psyche about the way in which the country is conducted, about our goals. There is a deep-seated, well justified repugnance with what we have done to the environment. There is a sense of horror about some parts of our own history. There is a great sense of disillusionment within existing institutions, as there was throughout the Vietnam war and the "Watergate." If your experts told you you were going to win in Vietnam, why should you believe them when they tell you that you are going to have no electricity in 1984? We are in a period of a sort of subtle anarchy, with a great distrust of everything that is established, and a great suspicion of the motives of every other segment of society.

These are very complicated social problems difficult to explain easily. Societies do not move as sociologists would wish, in a very orderly way, but in a very fragmented and disorderly way. Because we are in this period of anarchy, we have established a large number of ways of frustrating action.

It used to be that young men or women living at school, went out into the world and had to establish a record of excellence in one of the professions, sciences, or other discipline of their choosing, before they were able to reap the rewards of society: recognition, wealth, influence, power -- and I will say again, recognition, because in some ways, recognition is the great reward that society bestows. All of these other things sometimes simply buy recognition.

Today it is possible for people to leave their institutions of learning, go into the world, set up as official opponents of whatever is going on, and achieve almost instantly the kind of recognition that once took some considerable effort.

We have the phenomenon of Ralph Nader and many, many other people who have now built careers in opposing various actions. They have been particularly successful in opposing the development of energy projects through the administrative legal process, through recourse to litigation on a whole vast variety of issues. And this is the most litigious society in the world. We have more lawyers per capita than any other nation.

We have found people who can bend our system for noble and decent purposes through the abuse of administrative law and the review of administrative legal procedures in the courts. This has produced a state of affairs in which we are unable to move to correct the energy imbalance. We are unable to lease the coal lands, to drill the continental shelf, to build power plants of various kinds (especially nuclear power plants, but also many fossil plants). Utilities in some states have to have as many as 36 permits before they can take any major action. You cannot build an oil refinery almost anywhere anymore. There are some dramatic and frightening examples of what this has produced. San Diego Gas and Electric Company is in the process of building some gas turbines for peaking purposes, in Mexico, because they cannot get the permits to build them in California. They are not only exporting a certain amount of security, they are also exporting a certain number of jobs.

Recently, a federal regulatory commission administrative judge recommended that a liquefied natural gas facility for converting Algerian imported liquefied gas into pipeline gas be built in Canada, although the two most desirable sites were north of here, because he said there was no possibility, in the present climate, with the tremendous environmental intervention, that the facility would ever get built in North America. So there is a further export of jobs.

We bring in all this oil and export a great deal of capital. This year we will pay out \$45 billion.

There is another aspect to the deteriorating energy situation: is it worth spending \$120 billion a year on national defense if you have established a situation in which you are basically indefensible, because your lifeblood has to be imported on this very vulnerable system of oil tankers from very unstable parts of the world?

The President of the United States became alarmed as he very quickly grasped the volume and size of the problem, and early in his administration he appeared on television using Henry James' phrase, "the moral equivalent of war," to describe the dimensions of the energy problem. Then he sent up two energy plans.

The problem is that the energy plans did not reflect the President's expression of the gravity of the situation at all. This gets me back to where I began. The reason that the President's energy plan does not reflect the gravity of the situation is because the President is a victim of the polarization over energy which I outlined to you a while back. The President was elected by a variety of constituencies, a major component of which was the environmental consumer, that whole left bloc that has embraced a certain attitude about energy that the President should not have embraced. It is not a fundamental part of the environmental consumer philosophy and it really does not belong there, but there is where it now rests.

When the President is chided, as he has been recently by the Council on Environmental Quality, or by the Natural Resources Defense Council, or by one of Ralph Nader's many groups, for giving in to the energy companies, or for embracing a "dangerous" technology, he is mightily aware that he is being chided for having deserted his constituency.

The President is, therefore, in a great deal of trouble, which is reflected in his message. It is a message which aspires to do one thing and sets about it in the guise of another because of the polarization problem and the fact that he is a populist President with a constituency on the left -- and I do not say that in any pejorative sense whatsoever -- of the Democratic party.

The things that are required to bring about conservation and a switch to solar power on scales that he would like to see, to stimulate domestic exploration for gas and oil, to stimulate the licensing of light water reactors in an expeditious way, and particularly to bring about the massive conversion to coal to which he is addicted, cannot be achieved in the political terms in which he is asking. He cannot do homage to this particular constituency and say we are not going to do anything difficult. He is in a lot of trouble because of this, and the Congress reflects the people quite well. I think this is a rather enlightened, wise, and sensitive Congress, and given the collegiate nature of Congress, and the limitations of consensus in such a large committee, it is a surprisingly thoughtful one. It is actually a Congress in which a great deal of fundamental homework is done by the members of the Congress.

If you take all of the Congressional reactions vis a vis the President's energy message, what they amount to is not a fight between the Congress and the White House, not a deep division on philosophy, but rather a bemused question that goes something like this: Mr. President, if this crisis is as serious as you have told us it is, why don't you send us a serious program to deal with it?

We are unable to take the serious actions to deal with what is palpably a serious problem, because of the extraordinary political climate in the country. When you have this kind of political climate, necessarily, after some time, somebody will develop a philosophy to fill into the vacuum which is forming. This is beginning to happen very quickly through the aegis of an otherwise unheard of young man, called Amory Lovins. Lovins (I have known him for some years) works for the Friends of the Earth in England, although he is an American who studied physics, and in October of 1975 in the influential journal of Foreign Affairs, he produced an extraordinary document that is going to have tremendous effect in maintaining the polarization on energy and, to my mind, in maintaining certain myths that are implicit in his thesis. Nonetheless, he is a substantial figure in this debate and should be taken seriously as such.

Mr. Lovins idea is that we are all going the wrong way and that we really do not need to do any of these things that I have suggested we need to do. We do not need extensive new exploration for oil or gas, or massive conversion to coal, or nuclear power, according to Amory; we need a re-think. He uses the poet's phrase about paths not taken and he has introduced the concept of a hard energy philosophy and a soft energy philosophy. The idea is that if you choose to take the so-called soft path in energy, you can do away with much of the unattractiveness of our society with a tremendous reliance on centralized systems, particularly for delivering electricity. Delivery of electricity, by its nature, is a centralized technology with a very centralized system.

Lovins has given us an intellectual veneer, an intellectual sheen, to that very substantial, quite articulate, and I think, misguided body of American environmentalists and intellectuals who find the repugnance that I referred to in many aspects of our society.

So the battle has been joined, very seriously and not to be underestimated. It so happens, that from time to time, somebody comes along with a seminal idea that has an influence far beyond what you might anticipate. The great examples, I suppose, are the examples of Rousseau, Marx, even Christ and, to a lesser extent, the environmental movement that was started by Rachel Carson with her book, Silent Spring. Nothing so monumental in this debate and the future of technology in society has come along since Amory Lovins put out his ideas. They are very seductive; they are very persuasive. I debated him recently in Seattle. I was surprised that in debate I thought he was less impressive than he was in his book and his papers, but he has had a very major effect.

He had a long audience with President Carter who used some of Lovins' figures in his speech the next day, so you can see the level of the acceptance of this idea that there is another way to go.

I think the danger is that one does nothing. The danger is that if one person over here says I am right, and one person over here says I am right, the political process tends to come down in the middle. It is amazing the way the political process so often thinks that the middle is right. There are circumstances in which this kind of compromising works, but they do not apply to technology and absolute facts. They apply only when you are dealing with ideas or with programs which are inefficient.

If you have two scientists arguing and one says the world is flat and one says it is round, the political solution is to say it is slightly curved. But that is not good enough. In approaching energy policy, because of the polarization, because of the deeply-held feelings, because there is now some philosophical base on both sides, because of the negative dynamic, and because there is now a vested interest on both sides, I am worried that we might settle for the concept that the world is a little bit curved and neither round nor flat. We will find that that is a very poor

way to decide a technological issue or an issue that deals simply with the amount of the resource that you have; we will find that you can only make a political judgment about an absolute physical fact. I sincerely hope that we do not make that mistake.

Thank you very much.

## "The National Perspective on Energy and the Role of the States"

Dr. James L. Liverman

Acting Assistant Secretary for Environment

U. S. Department of Energy

December 3, 1977 - Closing Plenary Session

The United States -- and, indeed, the entire world is now entering a great transition in the production and use of energy. The first transition occurred during the middle and latter half of the nineteenth century when wood, the predominant fuel of pre-Civil War times, gave way to coal, which powered the Industrial Revolution.

By the middle of this century, the age of coal had yielded, in turn, to the modern era of oil and natural gas. These past transitions differ significantly from the one we face today in at least one very profound way: we turned from wood to coal and from coal to oil and natural gas not because we ran out of those earlier fuels but, rather, because the new ones better suited our needs. Today, however, the new transition is taking place because we are running out of oil and gas.

The world is rapidly approaching the day when the demand for oil will outpace productive capacity. Some studies show that this may happen in the early 1990's. The consequences of this development are ominous for our economy, our balance of payments, and our position in the world.

The United States now buys almost 50 percent of its oil abroad. We have already been subjected to an oil embargo and rapid increases in the prices of petroleum. Indeed, the United States now pays more than \$14 a barrel for imported oil that cost us about three dollars a barrel in 1972.

At present, the oil diplomacy of Saudi Arabia is the chief moderating influence on further escalation of world oil prices. The Saudis control nearly 20 percent of total world oil reserves.

But, as the world's demand for petroleum begins to catch up with world productive capacity, even Saudi Arabia will not have enough oil to prevent scarcity, skyrocketing prices, and the potential for disastrous international tension.

This catastrophe would not mean that the world, or the United States, would totally run out of oil. It would mean that an increasingly industrialized world would demand more and more oil, raising prices to a level that would make its widespread use prohibitive -- unless, of course, the rate of growth of demand is reduced through energy conservation.



So the energy crisis is not an American problem, it is a world problem. And it is important that we understand it as a world problem. It is also important that we understand how our own actions can help to solve or aggravate the problem, both here and abroad.

As President Carter recently reminded us, "ours is the most wasteful nation on earth." We waste more energy than we import. We use twice as much energy per person as is used in Germany and Sweden -- nations with about our standard of living.

With roughly six percent of the world's population, America consumes one-third of the world's energy -- much of it wasted. But, if we waste energy, it is only because there has never been a reason for us to regard it as precious.

Two hundred years ago America used wood for its primary energy source. When the Industrial Revolution brought a need for coal, we found endless seams of it. Then, in this century, as our dependence on natural gas and oil began to grow, adequate domestic supplies of inexpensive oil and gas always became available despite periodic misgivings about our capacity to produce petroleum. Today, this is no longer true.

Coal, our most abundant domestic fossil fuel, continues to supply about 20 percent of our energy, although production and use is increasing. Nuclear energy accounts for only three percent of our total energy demand, while other sources combined amount to only three percent of our present energy supply.

So where does that leave us?

Large amounts of coal available, along with uranium, could significantly increase energy supplies. Also, potential energy exists in development of geothermal and solar resources and ultimately fusion reactors. There are, of course, other energy sources, but most of these either do not appear promising or will contribute but small amounts to our needs at this time. However, none of these resources provide a simple substitute for oil and gas usage.

With the large scale use of coal, come mining health and safety problems, increased environmental pollution, and land and water use questions. Fluidized bed combustion shows promise but questions still surround coal conversion to liquid and gaseous fuels.

Nuclear energy carries with it concerns about reactor safety, terrorist diversion of materials, and waste management questions. In fact, just last week the Secretary of Resources in Governor Brown's cabinet in California took a hard line on nuclear waste and was quoted as saying, "I'm responsible for the disposal of nuclear waste in this state and I don't

want any nuclear waste to be responsible for." From what I read in the newspapers about the way things are going in California, he might get his wish. California, as I am sure you know, has been a hotbed of nuclear controversy for years.

Then there is geothermal energy, expensive and fraught with unresolved questions of air, water, and land pollution, and subsidence questions.

Solar electric, ocean thermal, and solar heating and cooling all show promise but there are unresolved questions of land use, climatic effects, heat exchange fluids, relative cost, and other factors. These are only a sample of problems we must deal with.

A number of options are available but there are precious few easy answers. The most prudent course seems to be to pursue each potential source, including conservation, to the extent practical in the hope that all together they may be sufficient to meet our need.

This is the intent of the Department of Energy's (DOE) research and development (R&D) efforts. Our programs are designed to develop multiple energy technology options which are environmentally acceptable and economically sound. From these options the nation, the individual states, and each locale has the opportunity of helping to choose the best mix of technology to satisfy its own unique energy and environmental requirements. We all have been made painfully aware, while waiting in the gas lines in 1973, by the heavy hit in the pocketbook, by impacts on human health, and by environmental costs, of the potential repercussions of not taking this approach and doing so at the earliest possible moment.

Let me explore this with you briefly. My role in the Department of Energy is to look closely at the environmental parameters of all of this country's energy options and to ensure that environmental concerns are incorporated in the decision-making process for energy choices. We have come to realize as a nation that we can no longer take any action without considering the effects of that action on the environment. This is particularly true of energy. Development decisions must be made in the context of economic, social, and environmental realities. To have either an abundance of energy at the expense of the environment or a clean environment without sufficient energy is an empty achievement. Instead, we must achieve a balance between energy resource development and its set of implications, and a clean environment and its implications.

My biggest responsibility is to ensure from the beginning of the energy development process to the end -- from extraction to waste management -- that environmental concerns are identified, studied, and resolved at

each step in the technology R&D process. Failure because of inability to resolve environmental concerns constitutes a death knell for that technology just as surely as would failure of the technology process itself. As importantly, past experience has shown that stoppage of a technology by environmental issues late in development can be extremely costly.

Although my responsibility is to ensure that energy/environmental concerns are dealt with in a timely manner, we do not do or dictate all the work. There are, interestingly enough, at least 15 other federal agencies whose responsibilities also mandate that they ensure health, environmental integrity, and public acceptability of their particular technology or activity. The fact that all of the various impacts, whatever their origin, finally come to rest in the human body, in the same human environment, and in the same societal structure, demands more of us who work in this area. We must ensure that our individual and collective activities protect and enhance the quality of those things which we share in common -- our health, our environment, the integrity of our environment, and the integrity of our quality of life.

There must be some room for compromise, however. None of our energy comes totally free of impact. Even solar, the "Mr. Clean" of the energy line-up, has its costs, reflected in parched land and skin cancer. So the issue with energy becomes one of value judgement between the various true or perceived costs and the perceived or demonstrable benefits.

DOE alone will not be making those choices -- we can only influence the options. You, as part of the consuming public, and the decision makers in this state, will have much more influence on the ultimate choices. Thus, one of DOE's most important jobs is to involve and listen to the various publics, such as your legislative body and professional organizations represented here today, to ensure that your concerns are being addressed, and that you are aware of the choices and the implications of those choices.

If I may indulge in crystal ball-gazing, I would say that we are moving toward an energy production system which, to the extent possible, is going to be regionally oriented -- a system which relies on its own natural resources to meet its energy requirements. In some areas it will be coal, in others geothermal, nuclear may be more predominant in some regions, and in others, solar. While the advantages of local energy production may be obvious economically, the specific environmental implications must be evaluated. Regions of the country which have enjoyed relative environmental serenity will now be dealing with a new set of costs and benefits -- costs and benefits that are difficult to quantify and assign when the energy is produced in one region, and used in a third region. While technology impacts can be minimized by vigorous attention to environmental and health concerns, the development will not be without impacts and without difficult trade-off decisions for the people faced with these changes.

One of the greatest environmental implications of our nation's changing from a single resource base to a number of energy options is being prepared to deal with the multiple effects of that choice. That is why I believe that an important part of the energy acceptability process must be technology assessment and assessment of effects on the region as well as on the nation. As a result, we are working on a strong, regionally oriented, integrated assessment program which is designed to provide energy policy options for decision makers at all levels. While these efforts are located principally in major national laboratories because of the logistic support base available there, we believe strongly that the regional universities, the regional associations, and the state and local groups must be involved in a very intimate way in the formulation of programs of implementation as they may affect a particular region.

My office, for example, is supporting an experimental effort to help make regional representatives effective partners in the formulation of both regional and national energy programs. It is hoped that regional participation will represent all concerned groups, and that it will be drawn from a constituency of responsible, representative, and accountable organizations with a significant stake in the region's energy future.

As a first step in this process we began a project in New England to assist in establishing an interactive energy forum that would:

- . identify and illuminate the key issues and problems associated with the evolution of a viable energy program that could meet the needs of the region;
- . collect and evaluate available information and data;
- . identify alternative approaches and their various impacts;
- . compare and evaluate these future options;
- . recommend those options that are acceptable to the region.

My office is prepared to provide financial support if such a regional effort can be organized, and has contracted with MITRE (a federally chartered, not-for-profit corporation) to undertake the task of organizing such an effort. The project is to be neither a federal government nor a MITRE effort. MITRE's responsibilities in the organizational phase are to construct the forum, including:

- . recruiting a management team that represents the key segments of the New England community, and that would guide and oversee the effort;
- . recruiting, with the advice and assistance of the team, a director for the project;
- . organizing the project effort and, with the assistance of the team and project director, recruit the participants some of whom would be able to donate their services;
- . providing the data base and preparing a "strawman" description of the key issues and problems for the initial consideration of the forum participants;
- . defining the means for communicating and coordinating with the region during the course of the project.

MITRE's role will be that of host, providing the necessary facilities, administrative support, and technical staff to work with the other participants. Data modeling and analytical support will be supplied by Brookhaven National Laboratory under a DOE (ASEV) contract.

The immediate objective of the New England Regional Energy Forum is to define a set of alternative energy action plans for New England which are definitive and complete, have broad input from regional interest groups, and have a credibility with the region's population. The options for action will be evaluated principally on the basis of their ability to provide a safe and affordable future.

DOE is interested not only in the plan itself, which will provide a carefully drawn guide to R&D priorities, but also in the means by which the regional planning is accomplished. Further, DOE is open to new ways through which it can deal with regional energy problems. If the New England Energy Forum, or some variant of it is successful, DOE may sponsor similar efforts in other regions.

As a further example of how states may be assisted in enhancing their research capabilities, Brookhaven National Laboratory is beginning an environmental and economic assessment of Baltimore County's Refuse Derived Fuels project. We hope this will prove to be a fruitful relationship with the Maryland Energy Policy Office.

I would like to commend the important efforts Maryland has made to balance energy development with encouragement of economic and social growth, especially where you have the abundance of natural resources represented by the Chesapeake Bay, and your western and eastern farmlands. The 1971 Power Plant Siting Act

has built important planning and analysis expertise that serves the entire State. Another pioneering effort is the solid waste pyrolysis project undertaken by the City of Baltimore.

A basic realization we share is that trying to set up real public service experiments is much more difficult than performing the research that develops the concepts or reveals the complexities of a problem. Making that interface work, between research/knowledge and action, will be one of our greatest challenges. In attempting to institutionalize innovation we can cause some real conflicts. Bringing our considerable knowledge to the service of the public demands sensitivity not only to the nuances of problems, but especially to the perceptions, preferences, and needs of the people who are affected by actions that we may take, or technologies that we push toward commercialization.

In order to learn how to deal with building a benign future, there is absolutely no substitute for trying the difficult demonstrations that oftentimes become social and political experiments. We can learn only so much at the bench or in the laboratory - but technologies and policies have to be tested where they are going to have to perform - where they serve the public.







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## E v a l u a t i o n

An experienced Process Observer, SueLynn, studied the group dynamics of the conference and evaluated the effectiveness of procedures during the conference. The results of her evaluation questionnaire follow.

To assist in preparations for possible future conferences of this kind, Dr. Myron Miller and Diane Chapman Willis, conference coordinators, prepared the "lessons learned" section for inclusion here.

## CONFERENCE EVALUATION

### A SUMMARY OF PARTICIPANTS' REACTIONS TO THE AISLE CONFERENCE

A conference evaluation form was designed, distributed to all participants (legislators, professionals, and observers), and collected at the closing Plenary Session. The form consisted of six questions, and people were asked to indicate their workshop number and whether they were a legislator, professional, or observer. This report briefly summarizes the information contained in the completed evaluation forms.

The opinions presented in this summary are those which were made most frequently on the evaluation forms. In most instances, observations made only once are not included.

There were a total of 73 evaluations returned: 11 from legislators, 17 from observers; 35 from professionals; 9 from co-chairpersons; 1 from an AISLE planner. Not all questions were answered on each sheet. Tallies were kept for all responses to Questions 1 and 5. The questions and responses follow.

1) Did the conference live up to your expectations?    ☐ Yes    ☐ No

With only five exceptions, the response to Question #1 was "yes". Obviously, the conference met with the expectations of the vast majority of those who attended.

2) What was most helpful?

The answers to Question #2 indicated that all participants including legislators, professionals, and observers, were appreciative of the opportunity to come together to share and exchange information. Professionals expressed having a greater understanding of the legislative process and how they can impact on that process while the legislators appreciated receiving "unbiased" input from those persons who have the expertise and knowledge concerning energy issues. Legislators also appeared to have gained new insights into the complexity of technological concerns. All were appreciative of the communication links established between the professional and legislative communities as a result of interchanges, and the opportunity to work together toward a common goal. There were also a number of comments regarding the atmosphere of a "free flow" of information without the pressures of lobbyists and media personnel.

3) What was least helpful?

There seemed to be a general consensus that the plenary sessions,

as well as the speeches, should be fewer in number and shorter in duration. (Dinner and luncheon speakers, however, were generally well received). It was also frequently stated that the participants would have liked, 1) more information regarding expectations of themselves; 2) knowledge of the objective of the conference; and 3) issues to be covered in their sessions several weeks prior to the conference. Participation by more legislators was cited as desirable in several instances.

4) What would you definitely like to see changed to improve such a conference?

In answer to Question #4, suggestions were made, such as "more time for workshops", shortening the conference to "two full days", not including weekend time. "More information before the conference", and "better planning oriented toward participants" were also emphasized. Questions used to focus participants on topics sent out several weeks previous to the conference was suggested several times. Professionals encouraged that more representatives from industry, business, universities and relevant state agencies be involved in workshop sessions. One observer suggested that "no lobbying be allowed".

5) Please mark on the scale below your overall reaction to the conference.

1 (not helpful at all), 2, 3, 4, 5, 6, 7 (extremely helpful)

Sixty-one persons responded to Question #5, as shown in the table below.

<u>Response</u>	<u>Number of People Responding</u>
1	0
2	1
3	0
4	7
5	25
6	20
7	8

6) Other comments

Comments solicited by Question #6 included "let's do it again",

"would have liked to see more legislators present" (made by legislators);  
"can lines of communication opened up be kept open? how?" and "happy to  
have had opportunity to participate" by professionals; and an observer  
stated that this was a "successful experiment".

## Lessons Learned from the Symposium

and

## Suggestions for Those Contemplating Hosting Similar Functions

### A. Format and Procedures

- a) "Informal Workshop" approach does work well.
  - 1) Round-table seating encourages active participation and a relaxed atmosphere.
  - 2) One dozen to two dozen participants is an optimal workshop size. Workshops with a 50%/50% mix of legislators/professionals functioned better than those in which legislators were a minority.
  - 3) There are advantages to keeping the workshops "open": often an interested person from a citizens' group or a lobbyist can provide needed information or pose interesting questions. (And sunshine laws encourage open legislative functions anyway.) The rapport of a proper-sized group of participants can be maintained by seating interested public in a gallery, or to the side, but reserving time in the workshop for questions "from the floor."
- b) Pre-stamped returnable inquiries to legislators about their choice of workshop topics proved an effective way of organizing the potential issues. Responses to these inquiries generally reflected the spectrum of legislative proposals (bills) from the preceding session.
- c) Two full days of meetings, inclusive of opening and concluding plenary sessions, is workable from the viewpoint of legislators' time commitments and the duration of sustaining a productive dialogue. Evenings should be reserved for staff work, troubleshooting and meetings of workshop chairmen and rapporteurs. (The Maryland symposium had two half days straddling a full day session, and by consensus this was too long.) When the legislature is out of session, a two day meeting means that legislators will be setting aside three days if travel time is included.
- d) Lead times for organizing the workshops (quite aside from planning usual logistics of feeding, housing and arranging meeting halls) are easily underestimated. In order to secure a spot on legislator's calendars, line up professional participants, set workshop topics, and get legislative feedback on tentative plans, six months lead times are not excessive if organizing responsibilities have

been specifically delegated to one office or individual. If two or more groups are to share decision-making, nine months is a more reasonable lead time.

- e) The Maryland experience argues strongly for having each workshop co-chaired by one legislator and one topical expert. This helps to fuse the perspectives of the two kinds of participants, enhances a sense of mission, and keeps discussion moving at a lively clip.
- f) The effectiveness of each workshop depends more on the skill and attention to detail of the co-chairmen than on any other single factor. Co-chairmen should be chosen with regard to their ability to guide group discussions along fruitful lines and to synthesize ideas, and a willingness to devote time to advance preparations. Advance work here is crucial. It is suggested that each pair of co-chairmen meet at least once prior to the symposium in order to:
  - 1) Arrange for preparation of an in-depth treatment of one prototypical issue having legislative policy implications.
  - 2) Produce a list of tentative issues, bill discussions, policy directions, etc. which the workshop may wish to consider.
  - 3) Prepare short biographical sketches of the workshop participants, stressing professional expertise or legislative speciality. If addresses and phone numbers are included, and the list is distributed well in advance of the symposium, the participants will be the more comfortable for seeing who their colleagues will be, and the list will subsequently serve as a "source book" of contacts for follow-on liaison between legislators and topical experts.
  - 4) The topical expert co-chairman should send to non-legislative participants some guidelines a) outlining their role as representatives of the technical/scientific community rather than of specific companies or interests, b) setting the tone that the purpose of the symposium is to be of service to state government -- i.e., to be reactive to the needs and sensitivities of state legislators, and c) reminding them to avoid technical jargon.
  - 5) The legislative co-chairman should send an analogous note to legislative participants. This could help dispel uneasiness (as was expressed by some Maryland legislators) over entering dialogues with people having a deeper grasp of technical issues. It could be stressed that such dialogues are a two-way street, giving the scientists a better appreciation of the complexities and trade-offs involved when technical questions are handled in the context of day-to-day public decision-making. The essential ingredients for the legislators



to bring are questions on topics they feel are important and which they will state in their own way.

This degree of advance work is quite arduous, particularly for legislators whose schedules always tend to be busy. However, it will pay dividends for the workshops and increase the effectiveness of the vast majority of the participants, who will be coming into the sessions "cold."

- g) The choice of running workshops sequentially or simultaneously was considerably debated prior to the Maryland symposium. Concurrent scheduling precludes legislators from fully attending more than one workshop when they may have nearly equal interest in several topics. However, sequential running of workshops leads to unwieldy session size and, given overall time constraints, rules out discussions in-depth. The Maryland planners opted for the concurrent sessions and, with hindsight, would do so again. If concurrent workshops are run, overview can be provided by having the workshop co-chairmen present the sense, findings, and suggestions of their groups to the symposium as a whole at a closing plenary session. To do this the co-chairmen must essentially prepare during the workshops (plus work through some meals or evenings.) Rapporteurs and typing staff should be made available to each workshop in order to facilitate this task. In addition, one person per workshop should be provided as a staff aid to assist the smooth operation of the sessions in any way the co-chairmen deem necessary.
- h) The workshop co-chairmen will be attempting to combine a structured approach to problem solving (the tendency of technical participants) with the interactive approach more familiar to legislators (i.e., the development of a topic via face-to-face interactions as per a committee hearing or judicial inquiry.) It is in demonstrating the value of melding these two approaches that the workshops can make a valuable contribution to the legislative process.
- i) A one hour "mini-course" in group dynamics was conducted one evening during the Maryland symposium for the benefit of workshop co-chairmen. All those attending found the presentation (by Sue Lynn, who is well experienced in this work) refreshing and worthwhile. At the same time, many felt that the art of good-chairmanship had been already learned by years of practice.
- j) Scheduling of too many formal speeches (welcoming, keynote, overview, concluding, etc.), at meals and otherwise is a natural tendency considering the multiplicity of leadership and key committee people in the hosting legislature and professional organizations, and a desire for appearances by nationally known

figures who might help to draw attendees. The thing to guard against is reducing workshop time and attentiveness. Comments made following the Maryland symposium indicated a preference for fewer formal speeches and ranked these among the less effective features of the operation.

- k) Each of the AISLE/State Legislature conferences to date has produced 100-plus page proceedings, appearing not sooner than several months after the conference was held. If one intends to issue proceedings, it should be clear from the outset what prompts them:

- 1) archival purpose
- 2) tutorial -- in the sense of being a collection of issue briefs
- 3) policy-oriented -- to stimulate ideas on legislative initiatives and a comprehensive approach.

If not aimed in one of these directions, what purpose do proceedings serve?

- l) It is counterproductive to exclude state executive agency staff (particularly middle-level people) from participation. While it has been noted that one reason for renewed legislative interest in SSET is the growing disparity between scientific capabilities of executive and legislative staffs, few in a state have as good a day-to-day knowledge of each area's specific problems as do executive agency workers. Moreover, they are familiar with how legal charges and technical feasibility mesh. The Maryland conference was attended by some members of state energy and natural resource agencies -- but these participated in an "observer" capacity. A better arrangement would have had them seated as workshop participants in the same spirit as other technical experts.
- m) Detailed arrangements should be made to capitalize on (what in Maryland and previous AISLE conferences) is likely to be keen media interest. Staff should prepare timely press releases and assist newsmen in lining up pertinent interviews. If live coverage is desired, planning should include provision for camera and lighting crews, etc. Also, arrangements can be made several months in advance with professional society journals to print a news item or announcement about the conference.
- n) Legislators will be familiar with the State Capitol, but other attendees will be grateful for an "advance information" packet showing parking locations, sites of functions, accommodations and eateries (as well as side trips for spouses).

- o) Protocol and related questions will inevitably arise. If a key legislative contact, such as an assistant to the leadership, is designated to work with the conference organizers on these matters, it will promote prompt resolution of otherwise "sticky" decisions.
- p) The degree of legislative participation will depend on how actively the leadership promotes the conference. Designation of the conference as an official legislative function and permission to delegates and senators to be reimbursed for related expenses are a first step. If chairmen of the key committees make clear to their members (via letters and reminders) that their attendance is expected, the turnout will be stronger. Person-to-person notes from leadership offices will also help to insure a good turnout.
- q) A sizeable portion of the legislature will not attend the conference if experiences to date are a valid guide. In Maryland, in an attempt to convey some of the benefits of the conference to the General Assembly as a whole, a follow-up one-hour briefing was given at a joint session of both houses two weeks after the legislature reconvened. The workshop co-chairmen jointly presented 10-minute summaries of their proceedings. (This function was thought to be effective by many who had been unable to attend the conference.)
- r) "Observers" appear to need little encouragement to attend, and in fact, could show up in such numbers as to swamp efforts to maintain dynamic workshop size. In Maryland, each public/private/lobbying group was specifically requested to send no more than one or two representatives apiece.
- s) Costs of conducting a conference can be grossly estimated beforehand -- which would avoid unpleasant surprises for legislative budgets. A rough break-out of the fiscal side of the Maryland conference may be of some assistance in this regard.
  - 1) The Maryland General Assembly/AISLE Conference had 167 attendees (exclusive of staff). Of this total, 38 were legislators, 70 were AISLE members, and 59 were observers.
  - 2) Registration fees were:
    - i) \$20 for workshop participants, which helped defray costs of meals (one dinner, one lunch, and coffee breaks). Legislators were reimbursed for these and other conference related (travel, lodging) items out of usual expense accounts. The AISLE participants paid all of their own costs. In setting the registration fees, the Maryland General Assembly agreed, as

host organization, to pay for one formal dinner and staffing expenses. In the end, an additional cost was borne because fewer (70%) of those who early-on indicated they would take meals actually elected not to, so the General Assembly had to make good on a number of ordered but unconsumed dinners. To circumvent such a situation, it is advised that payment accompany advanced registration.

- ii) Observers paid a \$27 registration fee if they took meals or \$5 if they did not.

3) Expenses were as follows:

i)	Buildings and grounds -- security and maintenance	\$ 100
ii)	Two coffee breaks	\$ 130
iii)	Flowers	\$ 14
iv)	Transcripts and tapes	\$ 146
v)	Meals (for 150, including tips etc., two dinners and one lunch)	\$ 3,649
vi)	Reception room rental	\$ 31
vii)	Expenses for keynote speakers or consultants who had attended earlier AISLE conferences	\$ 600
viii)	Typists, receptionists, banquet coordinator, workshop staff	\$ 650
ix)	Proceedings (155 pps)	
	Photos	\$ 640
	Typing/Clerical	\$ 1,380
	Writing/Editing	\$ 5,700
	Reproduction (1200 offset copies)	\$ 3,360
	Mailing/Handling	\$ 500
	Staff Travel/Phone	\$ 100

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Total Expenses:	\$17,000
Total Receipts:	2,125
Net Costs :	14,875

B. Workshop Content

- a) Comparing accounts of earlier (New York and Massachusetts) AISLE conferences with observations in Maryland leads one to conclude that each legislature will view such an effort with different expectations. (Better appraisal of environmental or energy concerns might be a foremost goal in one setting while in another

such a conference might be viewed as a mechanism for actually fashioning a legislative program.) Delving into these legislative expectations and tailoring one's conference accordingly should be done at an early stage.

- b) Whether the workshops are viewed as a conceptual exercise or a precursor of bill drafting, their energies appear better directed towards examining many aspects of a few high-priority issues than in trying to touch lightly on a broad spectrum of topics. To paraphrase; piecemeal technical input is usual -- while comprehensive analyses are rare, with those pitched in layman's terms being rarer still. For example, analyses of energy conservation strategies which explicitly address trade-offs between near term and long range goals, between energy affordability and reliability, between economic and environmental impacts, between the interests of the rural and urban, rich and poor, the interplay of public versus private funds, and which address uncertainty in technical and econometric forecasts, could be a boon to formulating state policy.
- c) Legislative issues which have substantive scientific or technical components can frequently be translated into economic cost/benefit analyses. It is easier for most legislators to relate to dollars than to say, quads. Despite an avowed intention to have at least one seasoned economist at each Maryland workshop, in retrospect it seems that economic implications got shorter shift than one would like. Perhaps it would not be unfair to suggest that the ability to make plausible projections of economic and public fund consequences should be a yardstick for gauging how well a "technical" issue was understood.
- d) Legislators and scientists both rely heavily on pragmatism. It would seem natural, therefore, that workshop participants include some legislators/staff/executive agency people intimately familiar with ongoing innovative programs in other states, and that the successes and pitfalls of these "model" programs be discussed in depth to help assess if similar measures would be in the host state's best interests.





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